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Prevalence of Bovine Gastro Intestinal Parasites in Shebelberentaand East Blessa Districts in Western Amhara Region, North West Ethiopia

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Abstract: A cross sectional study was carried out from October 2018 to March 2019 to determine the major gastro-intestinal helminths parasite infection and their distributions in cattle in ShebleBerenta and East Blessa districts in Amhara region, North West Ethiopia. A total of 404 fecal and blood samples of cattle of different sexes and ages were collected from randomly selected cattle and examined for Gastro Intestinal (GIT) parasite eggs using sedimentation. The overall prevalence of GIT parasites was found to be 57.4%. Among districts, GIT parasite was 67.6% and47% from ShebelBerenta and East Blessa, respectively. The qualitative faecal examination techniques, showed a prevalence of *Stronglye*(2.9%), *Coccidia*(5.1%), *Ascaris* (55.1 %), *Trichuris* (5.1%) and *Paraphystomum* (5.1%) whereas the rest of 26.7% were infected with mixed parasites in Shebelberenta and *Stronglye* (14.9%), *Coccidia* (6.4%), *Ascaris* (44.7%), *Monezia* (2.1%), *Fasciola* (1.1%), *Trichuris* (1.1) and *Paraphystomum* (9.6%), *Schistosoma* (4.2%) and *Balantidium* (5.3) whereas the rest of 11.7% were infected mixed parasites in East Blessa. Significant differences were observed in age, body condition but sex wise prevalence was not significant (P>0.05). It can be understood from the present study that GIT parasites are the major problem of cattle health which requires great emphasis to reduce the effect. Awareness creation and proper control measures of GIT parasites should be given for the stake holders.

Key words: Cattle · East Blessa · Ethiopia · GIT Parasites · Sedimentation · ShebelBerenta

INTRODUCTION

Ethiopia posse's about 53.99 million heads of cattle [1]. In Amhara region 10,512,777 of cattle are found [2]. In spite of the large population of cattle, productivity in Ethiopia is low due to poor nutrition, reproduction insufficiency, management constraints and prevailing animal disease [3]. In Ethiopia, livestock playing an important role in the livelihood of poor farmers and provide a vast range of products and services such as meat, milk, skin, hair, horns, bones, manureand urine, security, gifts, religious rituals and medicine [4]. Livestock diseases are one of the main production constraints in which helminthes parasites are among the biggest causes of production losses and are responsible for both direct and indirect losses [5].

Gastro intestinal parasites are a world-wide problem in livestock as well as in agricultural sector and responsible for major economic losses. The economic impact of these parasites on animals industry is great. The impact is greater in Africa in general and Ethiopia in particular due to the availability of a wide range of agro-ecological factors suitable for diversified hosts and types of helminthes. The most serious economic consequences of gastrointestinal parasites based on the overall number of worms, number of genera and species present, general levels of pathogenicity and wide spread distribution [6]. In recent study, Tibbo [7] found that parasitic infection of cattle is major factors responsible for economic losses through reduction in productivity and increased mortality in heavily parasitized animals. Especially parasitic nematodes (roundworms) are

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extremely important in both human and animal diseases [7].

The most important helminths parasites in cattle include nematodes (round worms), trematodes (flukes) and cestodes (tapeworms). These parasites are a worldwide problem for both small and large-scale farmers [8].

Despite the immense progress made to control to parasitosis, farmers in Ethiopia continue to incur significant losses due to the availability of information in the epidemiology of parasites. Furthermore, parasites appear to be a major factor for lowered productivity of Ethiopia livestock sector. To take the control measures assessment and epidemiological surveillance of parasite by different diagnostic method is important [9, 10] Emphasis must be placed on preventing environment from becoming contaminated. This is achieved by production of safe pastures which intern achieved by a variety of means by like silage and hay after mach, pasture resting, reseeding and burning of pasture and anti helmintic treatment [11].

Most of the studies conducted on the prevalence and distribution of GIT parasite in the country tended to Central and Northern Highland and semi arid regions of Eastern Ethiopia and little is known about the prevalence and distribution of GIT parasite inShebelBerenta and East Blessa districts.Therefore, the objective of this study was as follows:

- To assess major gastro-intestinal helminths parasites infection and their distributions in cattle in ShebelBerenta and East Blessadistrics inAmhararegion, North West Ethiopia.

MATERIALS AND METHODS

Study Area: The study was conducted in two selected districts, Shebel Berenta from East Gojjam and East Blessa from Central Gondar of Western Amhara region (Figure 1). Shebel Berentaworeda is located in E/Gojjam Zone, situated in the N/ Central High lands of Ethiopia in the Amhara regional state, extending between 10° 15' N to 10° 30' N degrees latitude and between 38° 15' E to 38° 27'degrees of longitude [12]. It is found at about 293 km NE of Addis Ababa and about 28 km from Bichena. ShebelBerentaworeda is bordered on the Southwest by Dejjenworeda, on the North West by Enemay woreda, on the North Enarj Enawgaworeda and South and South East Abay River. Even if the woreda has long boundary

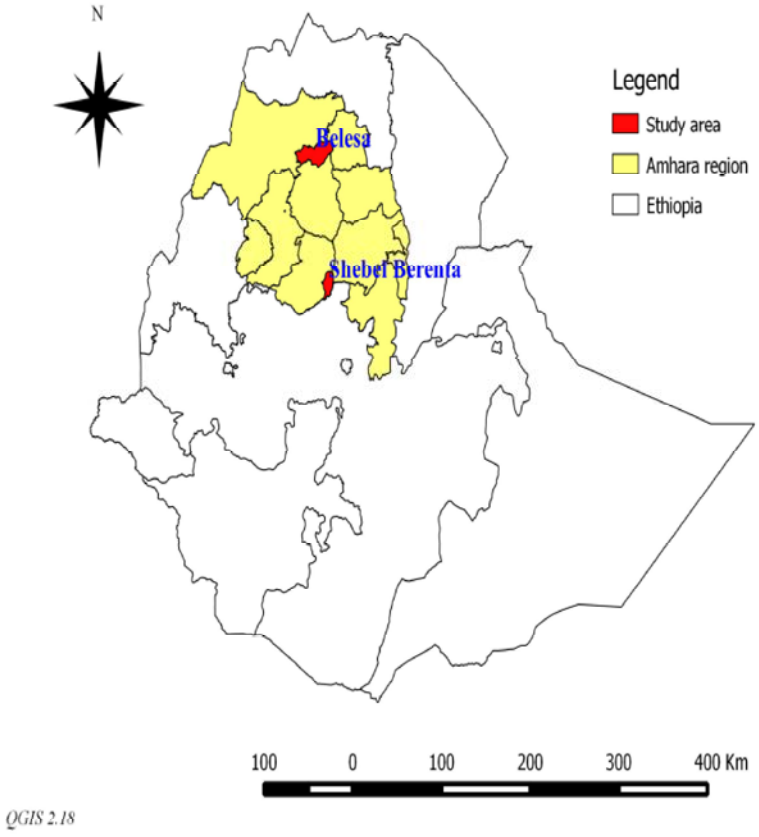

Fig. 1: Map showing the location of the study area. Source [12].

line with Abay river, economic gains from the river is limited to some households in the low land livelihood zone as its deeper valley inhibit the irrigation agriculture. Misraq Belessa or East Belessa is one of the woredas in the Amhara region of Ethiopia and extending between 12°31'N degrees latitude and 38°95'E degrees of longitude. It is named after the former province of Belessa, which lay in the same area. Part of the Semien Gondar Zone, MisraqBelessa is bordered on the South by Debub Gondar Zone, on the West by MirabBelessa, on the Northwest by the Wegera, on the north by Jan Amora and on the east by Wag Hemra Zone. Towns in MisraqBelessa include Hamusit. MisraqBelessa was part of former Belessa woreda [12].

Study Animals: Animals used in this study were zebu cattle, which were usually kept under an extensive husbandry system. Animals were kept to graze freely during the day and housed in poorly constructed barns at night. Animals were obtained water in the rainy season from seasonal rivers while in the dry season from perennial rivers flowing long in their locality.

Study Design and Methodology

Cross-Sectional Study: Cross-sectional study was conducted from October 2018 to April 2019 to estimate the prevalence of GIT parasitein the study areas.

Sampling Method and Sample Size Determination: Two districts were selected from Western Amhara region, Northwest Ethiopia. The PA's were selected based on their accessibility to transport. The sampling strategy was the simple random sampling. The age of animal was determined by dentition [13] and categorized into two age groups (adult and young) and the body condition score was grouped in to poor, medium and good conditioned animals based on the appearance of ribs and dorsal spines applied for Zebu cattle [14]. To estimate the prevalence of cattle internal parasite, sample size was determined by using simple random sampling method given by Thrusfield [14]. To determine sample size, previous studies conducted in Gondar zuria by Tigist *et al*. [16] weretaken into consideration so the expected prevalence of 27.57% absolute desired precision of 5% at confidence level of 95% was used. As a result a total of 306cattle were needed to be sampled [14] but in order to increase precision 404 samples were sampled.

The formula for estimating sample size was that of cited in Thrusfield [14] as follows

$$N = \underline{Z}_{\alpha}^{2}/d^{2}p_{exp}(1-P_{exp})$$

where, $Z_{\alpha=}$ the normal distribution value for a given confidence level, N= required sample size, p_{exp} = expected prevalence, d = desired absolute precision. Where, N = required sample size Pexp = Expected prevalence (27.57%), d = desired absolute precision (0.05).

Parasitological Examination: Fecal samples were collected directly from the rectum of cattle with strict sanitation. Collected fecal samples were preserved in 10% formalin and subjected to qualitative coprological examinations to investigate the major gastro-intestinal helminths parasites involved and to determine the prevalence of gastrointestinal helminths parasites in the area. After labeling with specific identification number, each sample was transported to Bahir Dar Animal Health Investigation and Diagnostic laboratory for parasitological examination. Parasitological examination was done by sedimentation [17, 18].

Data Management and Analysis: At the time of sampling the owner's name, animal age, animal sex and body condition score were recorded using the animal blood sample collection format. Parasitological data were handled similarly. Data was recorded during sample collection, parasitological examination into Excel Spread Sheets to create a data base and import to SPSS version 20 for analysis. Descriptive statistics andChi square to express results and analysis of variables. GIT parasiteinfection rates with different variables like age, sex, body condition score were compared by using Chi square.The prevalence rate of GIT parasitewas calculated as the number of parasitological positive animalsdivided by the total number of animals were examined and multiplies by 100.The test result was considered significant when the calculated P-value was less than 0.05 at 95% confidence interval.

RESULTS

Parasitological Survey

GIT Parasite Prevalence: The overall prevalence of GIT parasite in the study area was 57.4%. The prevalence of GIT parasite in the two districts was found to be 67.6% and47% inShebelBerenta andEast Blessa, respectively.Prevalence of GIT parasite in different PA.s as shown in Table 1.

Type of parasites investigated in the study; there were different types of GIT parasites observed. Out of 404 examined cattle, 57.4% were positive with one or more types GIT parasite. The proportion of single parasitic infection (79.3%) was higher than that of mixed (20.3%)

Table 1: Prevalence of GIT parasites in different PA's

No	Districts	PA's	Total sample	No of positive	Prevalence% in PA's	Prevalence% in Districts
1	Shebelberenta	Woboworie	65	48	73.8%	67.7%
		Gedaeyesus	68	48	70.6%	
		Selelekula	71	42	59%	
2	E/Blessa	Goga	69	35	50.9%	47%
		Tartarua	66	33	50%	
		Arebateguar	65	26	40%	
	Total		404	232	57.4%	57.4%

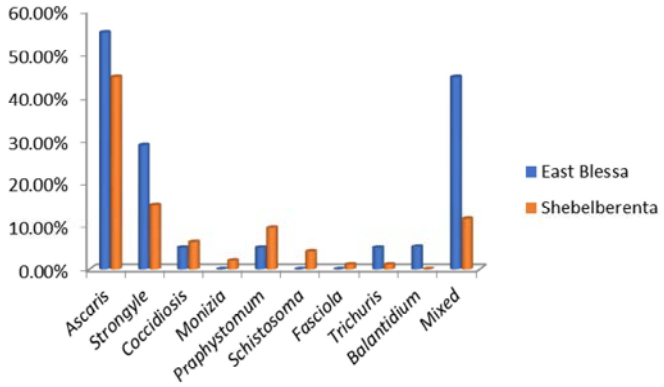

Fig. 2: Types of parasites investigated with their percentage

parasitic infection. In ShebelBerenta, out of 204 cattle infected with type of gastrointestinal parasites namely *Stronglye* (2.9%), *Coccidia* (5.1%), *Ascaris* (55.1 %), *Trichuris* (5.1%) and *Paraphystomum* (5.1%) whereas the rest of 26.7% were infected with more than one types of the above indicated species.

In E/Blessa out of 200 cattle infected with type of gastrointestinal parasites namely *Stronglye* (14.9%), *Coccidia* (6.4%), *Ascaris* (44.7%), *Monezia* (2.1%), *Fasciola* (1.1%), *Trichuris* (1.1) and *Paraphystomum* (9.6%), *Schistosoma* (4.2%) and *Balantidium* (5.3) whereas the rest of 11.7% were infected with more than one types of the above indicated species as shown in Figure 2.

The Associations of Thedisease with Districts, Age, Sex and Body Condition Were Assessed: The overall prevalence of GIT parasite in ShebelBerenta was 67.6% and E/Blessa was 47% and the difference was highly significance (P<0.05).Comparison was made on the prevalence of GIT parasites within the age groups in order to investigate the presence of any association. Thus, the cattle were categorized into two age groups. According to the result of the present study the prevalence of GIT parasite in animals with greater than three years of age (65.6%) was significantly (P<0.05) higher than those recorded in cattleunder three years of age (17.6%). There was minor prevalence difference observed between sexes. Prevalence of GIT parasite observed was 58.6% in male cattle while 56.1% was recorded in female cattle, respectively. However, there was no statically significant sex related difference (P>0.05).

Table 2: The prevalence of GIT parasites with host related different risk factors

Risk factors	No of animals examined	No of positive animals	χ^2Test	P-Value
Districts				
Shebelberenta	204(50.5%)	138(67.6%)	10.45	0.003
E/Blessa	200(49.5%)	94(47%)		
Age				
<3	68(16.8%)	12(17.6%)	36.84	<0.001
>=3	336(83.2%)	220(65.5%)		
Sex				
Female	196(48.5%)	110(56.1%)	0.24	0.463
Male	208(51.5%)	122(58.6%)		
BCS				
Poor	217(53%)	154(66.4%)	27.64	<0.001
Medium	154(38.1%)	73(31.5%)		
Good	33(8.2)	5(15.2%)		

There was statistically significant variation (P<0.05) observed among the different body condition categories. The highest prevalence was observed in poor (66.4%), followed by medium (31.5%) and good (15.2%) body conditions of cattle as shown below in Table 2.

DISCUSSION

The current study showed that cattle from study area were infected with wide variety of gastrointestinal parasites including nematodes, cestodes, trematodes and protozoa. The overall prevalence of gastrointestinal parasites in the present study was 57.4%. This result agrees with the result of previous works by Regasa*et al.* [19], Derib [20], Nwigwe *et al.* [21] were they reported prevalence of gastro-intestinal parasite of 50.2% from Western Ethiopia, 50.0% from Northwest Ethiopia and 50.8% from Southeastern Nigeria, respectively. This result is also similar with that of Ntonifor *et al*. [22] in which they reported the prevalence of 56.7% GI parasites of cattle in Western Cameroon. This finding is higher than 41.2% prevalence by Epherem [23] and 26.3% by Darsema [24] in Western Amhara region, Ethiopia. This higher prevalence in the study area could be due to the fact that cattle from the area have frequent exposure to the same communal grazing land that causes contamination of pasture, most favorable environmental condition for the development of larvae, variation in management and husbandry practices, climate and management of pastures. Different prevalence rate of GIT parasites was reported from different corner of Ethiopia as well as other countries due to the difference in management, husbandry, climate, topography and other factors. On the contrary it is lower than the previous 79.1% reports of Hailu *et al*. [25] within the country in Jimma town and 97% reports of SA square *et al*. [26] outside the country in Southern Ghana.

In the current study comparison was made on the prevalence of GIT parasites in male (58.6%) and female (56.1%) cattle to assess the existence of any association between the prevalence and sex. Thus, there was no sex related deference ($P>0.05$) observed in the prevalence of GIT parasite. The absence of association betweensex agreed with the findings of Tigist *et al*. [16] in Gonder; Fikru *et al*. [27] in Western Oromia and Hailu *et al*. [25] in Jimma town. However, in contrast to the finding of the present study, there is association between the sex and prevalence of parasites were reported [28-30] that female animals showed higher parasitic infection than males despite similar management practice due to the fact that female animals are more susceptible than male and hence sex is determinant factor in influencing prevalence of parasites.

Age is supposed to have some association with occurrence of internal parasite because age has an effect on responsiveness or to the development of immunity causing lower worm fecundity in adult animals' as well as adult animal may acquire immunity to the parasites through frequent challenges and expel the ingested parasite before they establish infection [31, 32]. Bilal *et al*. [33] also reported that calves up to six months of age were more affected by gastrointestinal parasite (86.67%) as compared to calves of 7-12 age (66%). However, in contrast to the reports of above authors, the present study revealed that cattle under 3 years of age were less infected with parasite (17.6%) than cattle above3 years of age (65.5%). The reason is that in the study area most of the newly born calves are managed in the house so that they are stall fed where as those cattle above 3 years of age are managed in free gazing system, due to this most of the time cattle above 3 years of ages have greater exposure to parasites than cattle under 3 years of age. This finding is in agreement with the work done by Adam and Anteneh [34] in Haramaya district which reported the concomitant increase in the prevalence with age of animals could be due to increase in frequency of contact with age and management factorsand also in consistent with reports from Gambia was adults and older animals bear high worm burden [35] but disagrees with Tigist *et al*. [16].

The present study further described the body condition of cattlewere significantly associated ($P<0.05$) with prevalence of GIT parasite. Cattle with poor body condition scores (66.4%) were infected at higher rate than cattle with medium (31.5%) and good (15.2%) body conditions indicating that loss of body condition of cattle in study area were due to GIT parasitic infection.Likewise, Tigist *et al*. [16] reported considerably higher prevalence in poor body condition cattle (65.1%) than in medium (26.3%) and good body condition animal (13.6%). Thispoor body condition might be due to malnutrition, other concurrentdisease or the current parasitic infection which lead to poorimmunological response to infective stage of the parasite. This relationship could be explained by exacerbation of parasitic infection in poor body condition animals due to lowered immunity. However, the report disagrees with the work of Fikiru *et al*. [27] and Hailu *et al*. [25].

CONCLUSION

Study area indicated that, gastrointestinal parasite was found to be an important health problem due to its high prevalence. The prevalence of cattle GIT parasites in the study area is 54.7% indicating that parasites can be considered as one of the production constraints of cattle in the study area. In the present study all risk factors were found to be associated with the prevalence of GIT

parasites with exception of sex. In conclusion, GIT parasites cannot be ignored as a non important disease in current study area where it may continue to become a hazard to livestock industry of the country in general and inhibit the productivity of animas of the area.Based above conclusion the following recommendations are forwarded;

- All responsible body in general should be made aware of the impacts of the GIT parasite through veterinary extension likes training, booklets, media etc.
- Strategic parasitic control programs should be designed.
- Appropriate management practices such as housing management, feeding management/ rotational/ zero/ grazing
- Quantitative method of study should be conducted to determine the parasite load
- Detailed study should be conducted to clearly identify nematode parasites using fecal culture.

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