International Journal of Advanced Research in Biological Sciences
ISSN: 2348-8069
www.ijarbs.com
(A Peer Reviewed, Referred, Indexed and Open Access Journal)
DOI: 10.22192/ijarbs Coden: IJARQG (USA) Volume 9, Issue 5 -2022

Research Article

DOI: http://dx.doi.org/10.22192/ijarbs.2022.09.05.012

Prevalence of major gastrointestinal nematodes on bovine in and around Hirna town, Tullo District, Oromia regional state, Ethiopia

Usman Siraj Usman[1] and Ziyad Mohammed Bilal[2]

[1] College of Veterinary Medicine, University: Haramaya UniversityAddress: PO Box 138, Dire Dawa, EthiopiaE-mail: *usmetube430@gmail.com*

[2] College of Veterinary Medicine, Haramaya University, Haramaya,Ethiopia

Abstract

A cross sectional study was conducted from November 2018 to April 2019todetermining the prevalence of gastrointestinal (GI) nematode of cattle in and around Hirna town of Tullo district, and to identify the specie involved and to assess risk factors nematode infestations. A concentration (floatation) technique was performed to identify major nematode eggs of cattle. The eggs of parasites were identifiedon the basis of morphology and size of the eggs under light optical microscope. Descriptive statistics and chi-square test were used to describe frequencies of nematode species and association between risk factors and occurrence of nematode species.Out of 384 fecal samples of cattle collected and examined, 165 (43.0%) animals were found positive for at least one GI nematode infection and parasites identified were*Trichostrongylus spps* 9.4%, *Haemonchus*(7.3%), *and Strongloid spps* (7.3%), *Bunostomum spps* (6.5%), *Oesophagostomum spp* (4.2%) and *Ostertagiaspp* (3.1%)*as single infection.Mixed infections involved Trychostronglus with Eosophagastom spp* 2.6%, *Haemonchus with Strongyloid spp* 1.3%,*Trichostrongylus with Ostertagia spp* 0.8% *and Bunostomum* with *Ostertagia spps* 0.5%.

Among five potential risk variables considered in the analysis, four of them (age, body condition scores, breed and origin of the animals) were found to be significantly associated ($p < 0.05$)with the presence of GI nematode parasites. The present study showed that bovine gastrointestinal nematodes are of the major cause of helminthiasis in the study area. To get clear epidemiological picture detailed study should be conducted to clearly identify parasitic nematodes using fecal culture, postmortem examination and seasonal prevalence of these parasites should be carried out.

Keywords: Cattle**,** GI nematode, prevalence, Hirna Town

Introduction

Livestock production constitutes one of the principal means of achieving improved living standards in many regions of the developing world. In Sub-Saharan African countries, livestock plays a crucial role both in national economies and the livelihood of rural communities. It provides drought power, milk, and meat, input for crop production and soil fertility and raw material for industry. In Ethiopia, livestock production accounts for approximately 35 to 49% of the total agricultural GDP and 16 to 17% of national foreign currency earnings (Metaferia F.*et al.,* 2011).Ethiopia possesses about 59.5 million heads of cattle (CSA, 2017).Livestock play an important role in providing export commodities including hides and skins. However, constraints such as the traditional management system of livestock, limited genetic potential of the indigenous animal breeds and prevalence of many livestock diseases, lack of appropriate disease control policy and veterinary services the potential of livestock based economy has been reduced. (Yasin, 2017).

Diseases have numerous negative impacts on productivity and fertility of herds i.e. losses due to mortality and morbidity, loss of weight, depressed growth, poor fertility performance, decrease physical power and the likes (Elsa *et al*., 2012).Helminth parasite infections in cattle's are a primary factor in the reduction of livestock production and productivity (Wadhawa *et al*., 2011).Helminthosis lead to a reduction in fertility, work capacity, involuntary culling (Rafiullah *et al*., 2011), reduction in food intake, weight and milk production, and higher mortality rate (Getachew *et al*., 2012). The gastrointestinal tract (GIT) of cattle harbors a variety of parasites, particularly helminthes, which causes clinical and subclinical parasitism. Gastrointestinal nematodes are cosmopolitan parasites that develop within the digestive tract of domestic ruminants. These parasites adversely affect the health status of animals and cause enormous economic losses to the livestock industry (Rafiullah *et al*., 2011; Singla *et al*., 2014).

Studies have shown that helminth parasites are by far the most serious causes of production losses in farmed ruminants and the nematodes are indisputably the cause of serious production losses to ruminants in sub-Saharan Africa, and indeed worldwide (Ng'ang'a *et al*., 2004; Odoi, 2007; Kanyari *et al*., 2009).It has been estimated that about 10% animals die annually due to parasitic diseases in the world (Chavhan *et al*., 2008). The problem is however much more severe in tropical countries due to very favorable environmental conditions for helminthes transmission (Mohanta *et al*., 2007).The losses are manifested in terms of morbidity/mortality in acute cases and reduced weight gain, feed conversion, milk production, and poor reproductive performance, particularly in chronic infections (Edosomwan and Shoyemi, 2012).

The epidemiology of nematodosis is determined by several factors governed by parasite-host-environment interactions. The major risk factors can therefore be broadly classified asparasite factors (including epidemiology of the different species), host factors (genetic resistance,age and physiological status of the animal) and environmental factors (climate, nutrition, stockingdensity), Bennema et al. 2010). Interaction of various risk factors influences the prevalence of GI nematodesin food animals and includesage,sex, weather condition and husbandry or management practices (Raza etal. 2007; Khan et al. 2010). The prevalence of GI helminthes parasites is quite deferent in deferent species and the severity of the infection also vary considerably depending on local environmental condition such as humidity, temperature, rainfall, vegetation and management practice(Gizachew, 2007; Tesfaye, 2009 and Elsa *et al.,* 2012).

The diagnosis of nematode infections in livestock has been based on the clinical signs and detection of nematode eggs or larvae in the faeces by direct microscopic examination. Quantifying number of egg per gram (EPG) of faeces is the best way of estimating parasite loads (Tesfaye T 2009).To take the control measures epidemiological surveillance of nematode parasite by deferent diagnostic methods like faecal examination,

determination and identifcation of specifc nematode species is important (Hiko A and Wondimu A, 2011).The eggs of the nematodes are most often diagnosed by floatation technique and the commonly used floatation solution for nematode eggs are sodium chloride or sometimes magnesium sulphate Taylor *et al*,. (2015).

The environmental conditions such as low lying water filled grazing land, humidity, environmental temperature of this area are suitable for growth and survivable of parasites and their intermediate hosts. However, very few reports were published on bovine GI nematode infestation of this area.

Therefore, the objectives of this study were

- To investigate the prevalence and identify major bovine gastrointestinal nematodes species were involved in and around hirna town
- To investigate the main risk factors associated with the prevalence of GI nematode infection in cattle

Materials and Methods

2.1 Study Area

The study was conducted November 2018 to April 2019 in and around Hirna town of Tullo district, western Hararge of Oromia region, Eastern Ethiopia. Hirna town is located at 375 kms east of Addis Ababa along the road to Harar and 45km from the zonal capital, Chiro. The climatic condition of the area is 47% highland and 53% midland which are located at altitude of 1600-2700 meter above sea level (a.s.l). Bioclimatic characteristics of the region are a mean annual temperature of 21°C (18.5°C minimum) and 23.5°C maximum) and the relative humidity of the area varied from 21.9-65%. It receives a bimodal rainfall; the average annual precipitation being 980 mm that comes from the long and short rainy seasons. The long rainy seasons (summer) this extends from June up to September while the short rainy season occurs during the months of March, April and May. The woreda has 30 (Peasant association) PAs and one town with total population of 120,953 (TWARDO, 2010).The soil type of the area Consists of *vertisoil* and sandy type of soil. The main agricultural products of the areas are maize, coffee and chat. The total livestock populations in the woreda 119422 bovine 13177 ovine, 37973 caprine, 6517 equine and 171,499 poultry. It is characterized by mixed crop livestock production farming system

2.2 Study Population

The study animal were 384 randomly selected cattle of two breed (296 local and 88 cross), sex (184 male and 200 female), urban and rural and different age group and body condition that were found in and around Hirna town. The sampled animals were stratified by age, sex, breed, body condition and origin during the sample collected.Body condition scoring of sampled animal was carried out and categorized into three scores as poor, medium and good according to the method described by Nicolson and butter worth (1986).The age of the animal was estimated by looking to the dentition pattern of the animals according to Delahunt and Habel (1986) and also by owners' response. Based on this, study animals were classified as calf (<1 year), young (1 to 3 year) and adult (>3 year).

2.3 Study Design

A cross sectional study was conducted to determine the prevalence of GI nematode parasites in cattle during the study period and to investigate the main factors influencing that prevalence.

2.4 Sampling Method and Sample Size

Simple random sampling technique was employed to select the study animals and feces were collected from the individual animals. The total number of cattle required for the study was calculated based on the formula given by Thrusfield, (2007). By rule of thumb where there is no information for an area, it is possible to take 50% prevalence. In this study 50% prevalence with 5% desired level of precision and 95%of confidence interval are used to calculate the

sample size using the following formula. Sample size was determined using the equation:

$$n = \frac{1.96^2 * \ Pexp\,(1 - Pexp)}{d^2}$$

Where N= Sample size
P= expected value
d= desired absolute precision
Then by taking p=50% and d=5%
N =1.962 x 0.5(1-0.50)/0.05
N=384

2.5 Study Methodology

Fecal sample collection: Fecal samples were collected randomly. Approximately 5-10gr of feces were collected directly from the rectum of the study animals using disposable plastic gloves and placed in plastic fecal bags that were then labeled. The collected samples were label with the necessary information and preserved in 10% of formalin and dispatched to Hirna Regional veterinary laboratory for coprological investigations.

Parasitological Technique*:* The fecal samples were subjected to standard qualitative examination using concentration (floatation) techniques following the standard procedures for detection the eggs of nematode (Hansen and Perry, 1994). Samples were immediately processed and examined on the day of collection or stored at refrigerated temperature (4°C) for later examinations. The eggs of parasites were identified from their morphological characters and measurements using a light optical microscope with a magnification of 10× and 40×according to the literature (Soulsby, 1986; Georgi and Georgi, 1996 and Hendrix, 2017).

2.6 Data Management and Analysis:

All the data obtained from the study were entered into MS Excel data sheets and coded. The coded data were imported and analyzed using SPSS version 21 softwareIBM. (2012). Percentages (%) were used to measure prevalence of the parasites as described by Hansen and Perry (1994) and chi-square ($\chi 2$) was used to measure associations between prevalence and the various variables including breed of the animals, age, sex, origin and body condition scores. In all the analyses, a 95% confidence interval and P-value of less than 0.05 ($P<0.05$) was set for significance of statistical associations between the dependent and independent variables.

3. Results

From total samples examined the overall prevalence of bovine gastrointestinal nematodes was 43% (165/384) were found to harbor one or more parasite species. Different variation was observed on the occurrence of GIN parasite among the risk factors. There was little prevalence difference observed between the two sexes. Prevalence of GI Nematode parasite observed was 42.4% in male while 43.5% was recorded in female, respectively. However, there was no statically significant sex related difference ($p>0.05$).

Comparison was also made on the prevalence of GIN-parasites within the age groups in order to investigate the presence of any association. The overall prevalence of nematode infection was found to be higher in calf (64.0%) when compared to adult (41.4%) and young (34.6%) animals; Thus, a significant association ($\chi 2=13.324$; $P=0.001$) in prevalence was shown among animals with different age group categories (Table 1).Concerning the prevalence of nematode infections in different body conditioned animals, higher prevalence was observed in poor (86.4%) than moderate (34.0%) and fat (14.0%) animals. Thus, strong statistically significant association was observed among the animals with different body condition scores ($P< 0.05$) (Table 1).

The present study also tried to identify the presence of any association between prevalence of GIN parasites based on breed of animals. The study revealed a significant difference ($p<0.05$) in prevalence of GIN infection between local

(45.9%) and cross breeds (33. %) (Table: 1).The prevalence of GIN parasites in different origin is summarized in (table3). The result of the study indicates 36.0%, and 46.9% in urban and rural respectively. Thus, there was statistically significant origin-related difference (P<0.05).

Identification of GI nematodes species:

Outs of 165 positive results identified 145 (37.8%) animals were infected with single nematode. Among single parasitic infection observed in the present study *Trychostronglus spps* are the most dominant. Followed by *Haemonchus spps* and *Strongyloid spps*. However, the least nematode infection was observed by *Ostertagia spps* (Table: 2).

Table 1: Association between risk variables and Prevalence of GI nematodes

Risk factor	Number of examined	Positive	Prevalence (%)	$\chi 2$	P-value
Age					
calf	76	46	60.5		
young	127	44	34.6		
adult	181	75	41.4	13.324	0.001
Sex					
male	184	78	42.4	0.048	0.454
female	200	87	43.5		
BCs					
good	118	17	14		
moderate	156	53	34		
poor	110	95	86.4	128.961	0.00
Breed					
local	296	136	45.9		
cross	88	29	33.0	4.672	0.02
Origin					
urban	139	50	36.0		
rural	245	115	46.9	4.353	0.024
Total	384	165	43.0		

Table 2: Prevalence and identification of single GI nematode Parasites infection

Parasite	No.	Prevalence (%)
Trychostrongylus spps	36	9.4
Strongloid spps	28	7.3
Haemonchus spps	28	7.3
Bonustomum spps	25	6.5
Eosophagostomum spps	16	4.2
Ostertagia spps	12	3.1
Total	145	37.8

Table 3: Mixed infection between different nematode identified

Parasite	No.	Prevalence (%)
Trychostronglus and Eosophagastom spps	10	2.6
Haemonchus and Strongyloid spps	5	1.3
Trychostronglus and Ostertagia spps	3	0.8
Bunostamum and Ostertagia spps	2	0.5
Total	20	5.2

As shown in the above (table 3) out of 165(43%) infested animals; total prevalence of mixed infection was 20(5.2%). Among mixed parasitic infection observed in the present study; *Trychostrongylus spp with Eosophagastom spps* 10(2.6%) was the most dominant one.

4. Discussion

Epidemiological investigation of nematodes in livestock using suitable and cost effective diagnostic methods is found to be important. Knowledge of the epizootiology of parasitism is a crucial requirement for the sustainable control of GI parasites, as they interact with their hosts under specific climatic, management and production conditions (Almeria and Uriarte, 1999; Waller, 1999). The current study revealed an overall prevalence of 43.0%, GI nematode infection in cattle. 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. The current result is similar to reports in Zimbabuwe by Pfukenyi *et al.* (2007) and Muluneh *et al*., (2014) and closely related to that of Yimer *et al*. (2015) who reported 41.5% prevalence in Dire Dawa. In contrast, the present study is lower than previous finding of Shirale *et al.,* (2003) who reported 58.00% prevalence and Adem and Anteneh, (2011) 54%in Haramaya University dairy farm. However, this study is relatively higher than some other reported from Ethiopia (Yehuelaeshet; 2005; Awraris *et al*., 2012) and other parts of the world (Ashutosh *et al.,* 2011; Brhanu, 201; Kabaka *et al*., 2013;)The deference in the prevalence reports of gastro-intestinal nematode could be due to the fact that the attributed to differences in agro- climatic conditions including quantity and pasture quality, temperature, de-worming practices, humidity and grazing behavior of the host in the study areas.

In this study, a significant difference was not observed in GI nematode infection in relation to sex ($p>0.05$) (42% male and 43.2% female). The result of the present study agrees with that of [Tigist *et al*., (2012) ($p>0.05$),Regassa*et al*., (2006) in western Oromia and Hailu *et al.* (2011) in Jimma town]. But, this is in disagreement with previous study report with Windom (2009), Birhanu (2011) and Tulu and Lelisa (2016) who found prevalence rates in males (45.86%) to be greater than that in females (41.4%).

The current prevalence of nematode infection was found to be higher in calf (64.0%) when compared to adult (41.4%) and young (34.6%) animals. The result of the present study agrees with that of Regassa *et al*.,(2006), Mohammed *et al*. and Swai *et al*. (2006) who have reported higher infection rates with nematodes in calves as compared with adult cattle. This could be due to the fact that calves are more susceptible than adult counter parts. 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' (Klooser man *et al*., 1991) as well as Adult animals may acquire immunity to the parasites through frequent challenge and expel the ingested parasite before they establish infection (Bilal *et al*., 2005).But the findings of this study are inconsistent with reports from Gambia where adults and older animals bear high worm burden by Fritsche, (1993).

A significant difference ($p<0.05$) was also found in variation of rate of infection among difference breeds where a higher infection was recorded on local breed cattle (46.5%) compared to cross breed (28.0%) cattle which is in agreement with the report of Tigist *et al*.,(2012) in and around Gonder town and Awraris *et al*. (2012). This may be due to the fact that farmers owned cross-breed or farmers that found in urban area are tend to follow intensive management system where as those farmers that haves our indigenous breed were tend to follow free grazing system mean extensive management system. Thus, the chance of exposure to infective parasitic egg or larvae of local-breed cattle is higher than those of cross-breed cattle. However, it is in contrary to reports of Bacha and Haftu, (2014) in west Arsi zone (64.15%). The differences observed could be due to the variation in the periods or seasons in which the studies were conducted, climate and husbandry of the animals. These studies were conducted on cattle managed under extensive management, which could increase the degree of pasture contamination, leading to higher prevalence rates.

In this study, significant difference ($p<0.05$) was observed in GI nematode infection in relation to body condition where a higher prevalence of Nematodiasis was recorded in poor body condition (62.8%) than medium (41.1%) and good body condition (27.3%).This finding is in agreement with the work done by Keyyu *et al*., (2003) in Tanzania and Regasa *et al*., (2006), Tigist *et al*., (2012) and Awraris *et al*., (2012)in Ethiopia. However, the report disagrees with the work of Hailu *et al*., (2011).This variation may be due to malnutrition, other concurrent disease or the current parasitic infection which lead to poor immunological response to infective stage of the parasite

There was statistically significant difference association ($P<0.05$) with GI nematode based on origin of the animal, the prevalence is high in rural(47.0%) as compared to urban (33.0%).The result of the present study agrees with that of Milkessa *et al*., (2016).Thus, higher prevalence was recorded in rural than urban cattle. The reason for higher prevalence in rural area than that of urban farmers may be due to difference in management system and awareness of the farmers about disease. Almost all farmers found in urban area implement intensive management system whereas those farmers found in rural area are apply extensive management system. Moreover, urban farmers have access to anti-helmentic drugs and better awareness than rural farmers about the importance of de-worming

Out of 384 samples examined 165 were found positive. Of these 145 (37.8%) had single and 20 (5.2%) had mixed infection with difference nematode species. this result agrees with the results of Bacha and Haftu, (2014) and Ahmed, (2005) observed higher percentage of single infection (65.20%) than mixed (2.51%) andShirale, *et al., (*2003) observed (60.29%) single and (6.00%) mixed infection. This low prevalence of mixed infection in the study area may be due to immunity of the host, season and De-worming practice and also due to similarity in the two agro ecological zones and similarity in study design.

When the documented data was analyzed for nematodes it shows that the most prevalent *spp* in cattle among nematodes was *Trichostrongylus spp*36(9.4%). This result agrees with previous studies reported by Belem *et al*., (2001) and Brhanu,(2011). This was lower than previous report of Adem and Anteneh , (2011)with 37% and higher than the report of Addisu and Berihu**,** **(**2014) and Shirale *et al*.,(2003) with respective prevalence of3.65% and 3.14%.The variation between the present study and previous findings might be due to the differences among the geographical locations, climatic conditions of the study areas. The prevalence of this parasite was more in the dry season as compared to the rainy season.

The existence of more than one nematode species in a host has an additive pathogenic effect on the host and the pathogenicity is usually high (Pfukenyi *et al.,* 2007). In this particular study the prevalence of mixed infection was 5.2%. Among mixed parasitic infestations observed in current

study *Trychostronglus spp* together with *Eosophagastom spp* (2.6%) were most dominant nematodes in cattle's. This result agree with the previous reports of Bacha and Haftu (2014) , which was recorded the highest mixed prevalence seen in west Arsi zone was *Oesophagostomum spp* with *Trichostrongylus spp*37(9.6%).But the findings of this study are inconsistent with reports from Kombolcha and Dessie Town, by Abdulkadir, *et al*., (2017)who reported *Oesophagostomum spp* together with *Bunostomum spp* (1.8%) as the most dominant mixed nematodes in cattle's. This variation could be due to similarity or differences in the two agro-ecological zones, sample size and similarity in the two study methodology

5. Conclusions and Recommendations

Gastro intestinal nematodes are important cattle health problems in the study area with prevalence of 165/384 (43.0%). The present study was based solely on concentration (floatation)techniques for detection of gastrointestinal nematode eggs; among the six species of GIN parasites investigated, *Trychostronglus* spp 9.4% was found to be the most prevalent parasite in the study area, whereas *Ostertagia spp* 3.1% was the least prevalent gastro-intestinal nematode. In the present study all risk factors were found to be associated with the prevalence of GIN parasites with exception of sex. In the current work, the prevalence of mixed infestation with two parasite species in the same host was found to be 20/160(5.2%). The infection was found higher in animals with poor body conditions, immature and local breed (those come from rural where there is no excess facility of veterinary clinic and the majority of them were managed under extensive open grazing). 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 production and productivity of farmers of the area in particular. Therefore, in order to minimize the wide spread prevalence of this parasitic problem in the study area the following actions should be taken:

- Detailed study should be conducted using fecal culture and postmortem examination to clearly identify parasitic nematodes and their seasonal prevalence in the study area.

Acknowledgments

Authors deepest thanks to the Hirna Regional veterinary laboratory members and the Communities for their logistic and material supports that highly aid for the completion of this work

Conflicts of Interest

There is no conflicts of interest.

References

[1]Abdulkadir.O, Muhammed .H, Alula. A and Tarekegn .T(2017).Study on the Prevalence of GIT Nematodes on Bovine in and around Kombolcha and Dessie Town, North Eastern, Ethiopia . DOI: 10.4172/2157-7579.1000477*J Vet Sci Technol* 8:5

[2]Addisu B, Berihu H (2014). Study on prevalence of gastrointestinal nematodes and coccidian parasites affecting cattle in West Arsi zone, Ormia Regional State, Ethiopia. *Journal of Veterinary Science & Technology*, **5**: 207.

[3]Adem H,and Anteneh W (2011): Occurrence of nematodiasis in Holstein Friesian dairy Breed, *Journal of Veterinary Medicine and Animal Health* Vol. **3**(**1**), **pp**. 6-10.

[4]Ahmed MAA (2010) Gastrointestinal (nematode) infections in small ruminants: Epidemiology, anthelmintic effcacy and the effect of wattle tannins. MSc Thesis submitted to School of Agricultural Sciences and agribusiness, University of KwaZulu-Natal Pietermaritzburg, **pp**: 1-6.

[5]Almeria, S. and J. Uriarte. 1999. Dynamics of pasture contamination by gastrointestinal nematodes of cattle under extensive management systems: Proposal for strategic control. *Vet. Parasitol***. 83**: 37-47.

[6]Ashutosh W, Tanwar R, Singla L, Eda S, Naveen K, and Yogesh K (2011): Prevalence of gastrointestinal helminthes in Cattle and buffaloes in Bikaner, Rajasthan, India. *Veterinary World*. Vol**.4** (**9**):Pp. 417-419.

[7]Awraris T, Bogale B, Chanie M (2012) Occurrence of Gastro Intestinal Nematodes of Cattle in and Around Gondar Town, Amhara Regional State, Ethiopia. *Acta Parasitol Globalis:***3**: 28-33.

[8]Bacha A, haftu, B (2014) Study on Prevalence of Gastro intestinal Nematodes and Coccidian Parasites selecting Cattle in West Arsi Zone, Oromia Regional State, Ethiopia. *J Vet Sci Technol***5**: 1-6.

[9]Belem. A.M.G, O. P. Ouédraogo and R. Bessin. 2001. Gastro-intestinal nematodes and cestodes of cattle in Burkina Faso Biotechnol. *Agron. Soc. Environ*. **5**(1): 17-21.

[10]Bennema SC, Vercruysse J, Morgan E, Staffor K, Hoglund J, Demeler J, Himmelstjern GS, Charlier
J. 2010. Epidemiology and risk factors for exposure to gastrointestinal nematodes in dairy
herds in northwestern Europe: *Vet Parasitol*. **173**: 247–254.

[11]Bilal MQ, Hameed A, Ahmad T (2009): Prevalence of gastrointestinalParasites in buffalo and cow calves in rural areas of Toba Tek Singh, Pakistan. *J. Anim. Plant Sci*., **19**: 67-70.

[12]Brhanu, T., 2011. Study on the prevalence of Gastrointestinal nematodes infection of cattle in and aroundGonder, North western Ethiopia.

[13]Chavhan PB, Khan LA, Raut PA, Maske DK, Rahman S, Podchalwar KS, Siddiqui MF (2008). Prevalence of nematode parasites of ruminants at Nagpur. *Veterinary World*, **1**: 140.

[14] CSA (2017).Central Statistical Agency CSA. Agricultural sample survey results for NNPR. Statistical report on livestock and livestock characteristics (private peasant holdings), Center of Statistical Agency, **Volume II**, Addis Ababa, Ethiopia.

[15]Edosomwan EU and Shoyemi OO, (2012). Prevalence of gastrointestinal helminth parasites of cattle and goats slaughtered at abattoirs in Benin City, Nigeria. *African Scientist.* **13**: 109-114.

[16]Elsa L, Sofia V, Elvira S, Maria M, Mendes G, and André M (2012).Factors Influencing Livestock Productivity. Environmental Stress and Amelioration in Livestock Production, *DOI: 10.1007/978-3-642-29205-7_2,* _ *Springer-Verlag* Berlin Heidelberg.

[17]Fritsche T, Kaufmann J, Pfister K: Parasite spectrum and seasonal epidemiology of gastro-intestinal nematodes of small ruminants in the Gambia. *Vet Parasitol*. 1993; **49(**2-4):271-283.

[18]Georgi, J.R. and Georgi, M.E (1990). Parasitology for Veterinarians. 5th edn., W.B. Saunders Company, London. **1990**: 140-381.

[19]Getachew H, Guadu T, Fentahun T, Chanie M (2012). Small Ruminant Hydatidosis: Occurrence and Economic Importance in Addis Ababa Abattoir. *Global Veterinaria***8(**2):160-167.

[20]Gizachew B (2007).Major livstock health problems in market oriented livestock development in metema woreda, north Gondar zone, Ethiopia. DVM Thesis .AAU, FVM, Debre Zeit, Ethiopia.

[21]Hailu D, Cherenet A, Moti Y and Tadele T (2011): Gastrointestinal helminth infections in small-scale dairycattle farms of Jimma town, Ethiopia School of Veterinary Medicine, College of Agriculture and Veterinary Medicine, Jimma University, P. O. Box 307, Jimma, Ethiopia *Ethiop. J. Appl. Sci. Technol.* **2***(1): 31 - 37*

[22]Hansen J, Perry B (1994). The Epidemiology, Diagnosis and Control of Helminth Parasites of Ruminants. 2nd ed. ILRAD, Nairobi, Kenya. Hawkins CD, Morris RS (1978). Depression of productivity in sheep infected with *Fasciola hepatica*. *Vet. Parasitol*. **4**:341-51.

[23]Hendrix C, Robinson E (2017). *Diagnostic Parasitology for Veterinary Technicians* (6th edn.), Elsiever **p**:56-80.

[24]Hiko A, Wondimu A (2011) Occurrence of nematdiasis in Holstein Friesian dairy breed. *J Vet Med Anim Health*. **3**: 6-10.

[25]Hiko A, Wondimu A (2013) Occurrence of nematodiasis in Holstein Friesian dairy Breed. *J Vet Medic Res***1**: 6-10.

[26]IBM. (2012) SPSS Statistics for Windows, Version 21.0. IBM Corporation, Armonk, New York

[27]Kabaka WM, Gitau GK, Kitala PM, Maingi N, Venleeuwen JA (2013) tHe prevalence of gastro intestinal nematode infection and their impact on cattle in Nakuru and Makurweini districts of Kenya. Ethiop *Vet J***17**: 95-104.

[28]Kanyari P, Kagira J, Mhoma RJ (2009). Prevalence and intensity of endoparasites in small ruminants kept by farmers in Kisumu Municipality, Kenya. *Vet. Parasitol*. **51(**4):137-141.

[29]Keyyu JD, Kassuku AA, Kyvsgaard NC, Willingham AL 3rd: Gastrointestinal nematodes in indigenous zebu cattle under pastoral and nomadic management systems in the lower plain of Southern highlands of Tanzania. *Vet Res Commun*. 2003; **27(**5):371-380.

[30]Khan MN, Sajid MS, Khan MK, Iqbal Z, Hussain A (2010). Gastrointestinal helminthiasis: prevalence and associated determinants in domestic ruminants of district Toba Tek Singh, Punjab, Pakistan. *Parasitology Research,* **107**: 787-794.

[31]Metaferia F, Cherenet T, Gelan A, Abnet F, Tesfay A, Ali JA, Gulilat W. A. (2011). Review to Improve Estimation of Livestock Contribution to the National GDP. Ministry of Finance and Economic Development and Ministry of Agriculture. Ethiopia: Addia Ababa.

[32]Milkessa Gelana ,Tesfaye Mersha ,Tesfaye Mideksa ,Habtamu Abera ,Misgena Duguma and Tegegn Gudeta (2016). Epidemiological Study of Gastro Intestinal Helminthes Parasites of Calves in Urban, Peri Urban and Rural Smallholder Dairy Farms of East Wollega Zone, Western Ethiopia**.***Journal of Biology, Agriculture and Healthcare*.**Vol**.6, No.17

[33]Mohanta UK, Anisuzzaman T, Das PM, Majumder S and Mondal MMH (2007). Prevalence, population dynamics andpathological affects of intestinal helminths in Black Bengal goats. Bangladesh. *J. Vet. Med*. **5**:63–69.

[34]Muluneh J, Bogale B, Chanie M (2014) Major Gastrointestinal Nematodes of Small Ruminants in Dembia District, Northwest Ethiopia. *Europ J Appl Sci***6**: 30-36.

[35]Ng'ang'a CJ, Maingi N, Kanyari PWN, Munyua WK (2004). Development, survival and availability of gastrointestinal nematodes of sheep on pastures in a semi-arid area of Kajiado District of Kenya. *Vet. Res. Com*. **28**(2)*:*491-501.

[36]Nicolson MJ, Butterworth MH (1986) A guide to condition scoring of zebu cattle. Int Livest Centre Africa, Addis Ababa, Ethiopia.

[37]Odoi A, Gathuma JM, Gachuiri CK, Omore A (2007). Risk factors of gastrointestinal nematode parasite infections in small ruminants kept in smallholder mixed farms in Kenya. *Vet. Res.Com*. **3**(6):1746-1186.

[38]Pfukenyi DM, Mukaratirwa S, Willingham AL, Monrad J (2007) Epidemiological studies of parasitic gastrointestinal nematodes, cestodes and coccidia infections in cattle in the Highveld and lowveld communal grazing areas of Zimbabwe. Onderstepoort *J Vet Res***74**: 129-142.

[39]Rafiullah A, Abdul S, Sayyed Shabbir R, Muhammed S (2011). Prevalence of Gastrointestinal tract parasites in cattle of Khyber Pakhtukkhwa, *Journal of Agricultural and Biological Science* **9**:6.

[40]Raza MA, Iqbal Z, Jabbar A, Yaseen M. 2007. Point prevalence of gastrointestinal helminthiasis in ruminants in southern Punjab. Pak: *J Helmin*. **81**:323–328.

[41]Regassa F, Sori T, Dhuguma R, Kiros Y (2006) Epidemiology of Gastrointestinal Parasites of Ruminants in Western Oromia Ethiopia. *Intern J Appl Res Vet Med***4**: 51-57.

[42]Shirale M, Meshram D, and Khillare K, (2003): Prevalence of Gastrointestinal Parasites in Cattle of Western Vidarbha Region. *Veterinary World*. Vol.**1** (**2**): 45

[43]Singla LD, Moudgil AD, Sood NK, Deshmukh S, Turkar S, Uppal SK (2014). A unique case report on *Setaria* species microfilariosis in adult cattle in Punjab (India). *International Science Journal***1**(2):1-3.

[44]Swai E, Mitui P, Mbise A, Kaaya E, Sank P (2006). Prevalence of gastrointestinal parasites infection in maasai cattle in Mygorongora District, Tanzania. LRRD. 18:1-11.

[45]Soulsby, E.J.L (1986). Helminths, Arthropods and Protozoa of Domesticated Animals, 7th edn. Bailliere Tindall, London. : 167-174.

[46]Taylor MA, Coop RL, Wall RL (2015) *Veterinary Parasitology*. 4rd edn. Blackwell Publishing, **pp**: 700-701.

[47]Tesfaye T. Characterization of goat production systems and on- farm evaluation of the growth performance of Grazing goats supplemented with different protein Sources in Metema woreda, Amhara region, Ethiopia. MSc Thesis, Haramaya University, Ethiopia. 2009.

[48]Thrusfield M. (2007). Veterinary epidemiology, third edition. Blackwell publishers, London. **pp**:267- 304.

[49]Tigist A, Basaznew B, Mersha C (2012). Occurrence of Gastro Intestinal Nematodes of Cattle in and Around Gondar Town, Amhara Regional State, Ethiopia. Ethiopia. *Acta Parasitology Globe***3**(2):28-33.

[50] Tullo Woreda Agricultural and Rural Development Office (TWARDO), 2010. North Gondar Zone Agricultural Office Report of Livestock Resource, **pp**: 14-15.

[51]Tulu D, Lelisa K (2016). A Study on Major Gastro-Intestinal Helminths Parasites of cattle in Tulo District, West Hararghe Zone, SouthEastern Ethiopia. *Journal of Veterinary Science and Animal Husbandry***3**(2):1027

[52]Wadhawa A, Tanwar RK, Singla LD, Eda S, Kumar N, Kumar Y (2011). Prevalence of gastrointestinal helminths in cattle and buffaloes in Bikaner, Rajasthan, India. *Veterinary World***4**(9):417-419.

[53]Waller, P.J. 1999. International approaches to the concept of integrated control of nematode parasites of livestock**.** *Int. J. Parasitol***. 29**: 155-164.

[54]Yasin, H., Tsegay, T. & Niraj, K. 2017. Prevalence of bovine trematodes and associated risk factors at Abergelle export abattoir, Mekelle, Tigray, Ethiopia. *Ethiopian Journal of Veterinary Science and Animal Production,* **1***(*1): 25-34.

[55]Yehuelaeshet, D., 2005. The Study on Endoparasite ofDairy Cattle in Bahir Dar and its surrounding. DVMThesis, Faculty of Veterinary Medicine, Addis AbebaUniversity. Debzeit, Ethiopia.

[56]Yimer M, Dinaol B, Mesfin A, Solomon S, Hassen B (2015). Prevalence of Gastrointestinal Nematode of Cattle in Selected Kebeles of Dire Dawa Districts Eastern Ethiopia. *Advanced Biomedical Research:***9**(6):418-423.

Access this Article in Online	
	Website: www.ijarbs.com
Quick Response Code	Subject: Veterinary Sciences
DOI:10.22192/ijarbs.2022.09.05.012	

How to cite this article:
Usman Siraj Usman and Ziyad Mohammed Bilal. (2022). Prevalence of major gastrointestinal nematodes on bovine in and around Hirna town, Tullo District, Oromia regional state, Ethiopia. Int. J. Adv. Res. Biol. Sci. 9(5): 108-119.
DOI: http://dx.doi.org/10.22192/ijarbs.2022.09.05.012