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Study on Prevalence of Gastrointestinal Nematodes and Coccidian Parasites Affecting Cattle in West Arsi zone, Ormia Regional State, Ethiopia

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Abstract
Livestock production constitutes one of the principal means of achieving improved living standards in many regions of the developing world including Ethiopia. A cross sectional study was conducted from November 2013 to April 2014 to determine the prevalence of gastrointestinal nematodes and coccidia parasites affecting cattle in west Arsi zone using flotation technique to investigate helminthes eggs. A total 384 fecal samples of cattle from different districts of west Arsi zone (Arsi-negele, Shashemene and Kofele) were collected and examined for incidence of gastrointestinal nematodes and coccidial infestation. Out of 384 animals examined, 188 (49%) animals were positive for gastro-intestinal nematodes and coccidian; and out of these positive animals 109 (57.97%) were infested with single genera of gastro-intestinal nematodes and coccidian, which include: *ostertagia spp* 7 (1.8%), *oesophagostomum spp* 5 (1.3%), *strongloid spp* 10 (2.6%), *Emeria spp* 11 (2.9%), *Trychostrongylus spp* 14 (3.6%), *hemonchus spp* 45 (11.7%), *Bunostomum spp* 17 (4.4%) and the rest 79 (42.02%) animals were infested with mixed genera of gastro-intestinal nematodes. These include *oesophagostomum spp* with *Trychostrongylus spp* 37 (9.6%), *ostertagia spp* with *hemonchus spp* 15 (3.9%), *Trychostrongylus spp* with *hemonchus spp* 17 (4.4%) and *strongloid spp* with *Bunostomum spp* 10 (2.6%). The prevalence of gastro-intestinal nematodes and coccidia was higher in adult and young animals as compared with calves, higher prevalence were also seen were communal grazing and watering areas are common.
Keywords: Gastro-intestinal Parasites, Nematodes, Coccidia, Prevalence, Cattle, West-Arsi zone, Ethiopia

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, meat, input for crop production and soil fertility and raw material for industry. Various estimate shows that the livestock sector contributes 13– 16% of total agricultural GDP (Yayneshet, 2010).

Ethiopia basically constitutes an agrarian society; the socio-economic activities of about 85% of the population are based on farming and animal husbandry (Solomon, 1994). Livestock plays a critical role for the majority of the Ethiopian population. Domestic animals are mainly used as drought animals, source of milk, meat, hide and skin and as pack animals. Apart from this they also serve as a means of risk diversion and accumulation of wealth among the rural community (Yohannes, 2002). Ethiopia is one of the most populous countries in Africa, having an estimated population of 67.2million in July 2002 with annual growth rate of 2.9%. The dominate economic feature of the country is the agriculture sector of which livestock is a very important and essential component (MOA, 2013.The recent livestock population estimates that the country has about 52.1 million heads of cattle, 24.2 million sheep, 22.6 million goats and 44.9 million poultry (MOA, 2013) .This figure indicates a huge potential of the country in the sector. In the high land areas of the country, livestock are raised together with crop cultivation for their livelihood where as in the low land or the 'pastoralists' subsistence is based mainly on livestock and livestock products (CACC, 2003). 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). The gastro- intestinal tract (GIT) of animals harbor a wide variety of parasites mainly helminthes, which causes clinical and sub clinical parasitism. These parasites adversely affect the health status of animals and cause enormous economic losses to the livestock industry (Irfan, 1984;Anwar *et al*., 1995;; Gizachew, 2007; Tesfaye, 2009).

The GIT parasite infectious are either clinical (Swai *et al,* 2006) the greatest economic losses associated with patristic infection are sub clinical (Shawa *et al*., 1997; keyyu *et al.,* 2005; Swai *et al.,* 2006). This is due to there are no any satisfactory parameters to quantify the effect of these lower levels of infection on production (Shawa *et al*., 1997)

The prevalence of GIT parasites in general of helminthes parasites involved species and the severity of infection also vary considerably depending on local environmental condition such as humidity, temperature, rainfall, vegetation and management practice (Tekle, 1991; Gizachew, 2007; Tesfaye, 2009; Elsa *et al.,* 2012). As far as the epidemiology of these parasites under various management conditions and parasitism is concerned, there

seems to have poor understanding (Keyyu et al., 2005) and from this perspective, the main objective of this study was:

- To estimate the prevalence of gastro-intestinal nematodes and coccidia parasites in cattles of west Arsi zone and
- To determine the spectrum of species of gastro-intestinal nematodes and emeria in the study area

Materials and Methods

Study area

Study was conducted from November 2013 to April 2014 in west arsi Zone of Oromia Regional State, Ethiopia, 251 km south of Addis Ababa, the capital city of the country. It is located in the Rift Valley Region. The zone extends from 6012'29" to 7042'55" latitude and 38004'04" to 39046'08" longitude. Most parts of the zone have elevations of ranging from 1500 to over 2300 m. Shashemene town is the administrative center of the zone. The mean annual temperature of the zone is found between 20-25 ^{o}C in the high land and 10-16 ^{o}C in the low land area. However, there is a slight variation of temperature from Month to months. October to May is the hottest months while June to September is the Coldest. On average, the zone gets annual mean rainfall of 1300 mm.

Table 1. Cattle population of west Arsi zone

Types of livestock's	2010	2011	2012
Cattle	3390756	3510328	3629900
Goats	317272	312027	322332
Sheep	543802	639107	694213
Horse	185706	198013	227784
Mules	8438	8605	8953
Donkeys	158008	161524	165367
Camels	51	53	57
Poultry	198020	245890	NA

NA= Not Applicable

Source: Zonal Agricultural and rural development office

Study population

The study was conducted on 384 cattle's which contains 301 local, 30 exotic and 53 cross breeds of cattle's which were taken from three different districts of west arsi zone (Arsi negele, Shashemene and Kofele). The study animals were divided in to three different age groups these are 89 Calves, 134 young and 161adult cattle were examined..

Sampling technique

The minimum sample size required for this study was determined by using the following sample determination formula according to Thrusfield (1995).

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

Where: n= required sample size ; 1.96 = the value of z at 95% of confidences level.

Pexp= expected prevalence of GIT parasites (50%) ; d = desired absolute precision level at 95% confidence.

According to the formula (Thrusfield, 1995) a minimum of 384 cattle's were sampled.

Study methodology

Questionnaire survey

Questioners were prepared for farmers in west arise zone which asks them about their farming system, cattle breed they are raring, deworming history of their cattle's, if they do deworming they were asked the frequency and when they deworm their herds for last time and also they were asked whether there was animal movement control and communal grazing land in their area or not and the result were attached with the format containing the history and code number of animals sampled from the same house hold. For three animals sampled from single house hold there was only one questioner representing them, for total of 384 animals sampled in this zone only 128 questioners were asked.

Sample collection and examination

The feces were collected directly from the rectum of randomly selected animals, by using new unused glove and putted in code labeled universal bottle, the code contains PA from which the sample were collected and ID number of animals from which the sample were taken. After collection the sample was transported to the laboratory by using ice bag and in the laboratory stored in refrigerator (4^{0}c) and processed within 24 hours of collection in the laboratory. Floatation technique was used to see eggs of helminthes of gastro intestinal tract (nemathodes egg and emeria oocyte). As the eggs were seen in this technique they were compared with photos of helminthes egg in the laboratory.

Data management and analysis

The raw data collected were entered into Microsoft excel spreadsheet and summarized by descriptive statistics. SPSS version 20 software was used to analyze the effects of assumed risk factors on the prevalence of different gastro-intestinal nematodes and coccidia of cattle.

Result

Prevalence of gastrointestinal nematodes and emeria

In the current study the overall prevalence of gastro-intestinal nematodes and Coccidia in west Arsi zone is 49%.

Prevalence of gastrointestinal nematodes and emeria within different age groups

As shown in table 2 below animals were categorized in to three age groups. These were calf, young and adult. Out of total number of animals examined 89 were calves, 134 were young animals and the rest 161 were adult cattle. Out of which 21 (23.6%), 70 (52.2%), 97 (60.2%) calves, young cattle's and adult cattle's were positive for GIT parasites, respectively. In this relationship age has significant (*P*= 0.000) association with parasitic infestation. As the age of animals increase prevalence of parasite also increase this may be due to increase contact with risk factor as animals get older and older.

Table 2. Prevalence of gastrointestinal nematodes and emeria within different age groups in west Arsi zone

Age group	No.	Positive	Percentage (%)
Calf	89	21	23.6
Young	134	70	52.2
Adult	161	97	60.2
Total	384	188	49%

X^2= *31.7; P*= 0.000

Prevalence of gastrointestinal nematodes and emeria within different districts

The prevalence of gastro-intestinal-nematodes and coccidian within different districts in west-arsi zone differ significantly (*P*=0.000) among the three districts west-arsi zone the highest in Arsi-negel (59.4%), followed by shashemene district (57%) and the list infestation was seen in kofele district (30.5%). This difference among these districts may be due to difference in availability of communal grazing and watering areas in this districts and difference in climatic condition. In Arsi-negele district about 74.2% animals have access to communal grazing and watering, followed by shashemene district with about 76.6% and 25% in Kofele district (Table 3).

Table 3: Prevalence of gastro intestinal nemathods and emeria within different districts in west Arsi zone

Districts	No.	Positive results (%)
Arsi-negsele	128	76 (59.40%)
Shashemene	128	73 (57.0%)
Kofele	128	39 (30.5%)
Total	384	188 (49 %))

X^2=*32.2 ; P*= 0.000

As shown in the above table equal number of animals were examined from each of the three districts, Arsi negele, Shashemene, and Kofele, 128 animals from each and out of these animals 76 (59.4%) animals were positive from arsi negele district, 73(57%) and 39(30.5%) animals were positive for GIT parasites in Shashemene and Kofele districts respectively. The prevalence of gastro-intestinal nematodes and emeria in this zone differ significantly among the three districts (*P*= 0.000). This difference in the prevalence may be related to different management system in different districts.

Prevalence of gastrointestinal nematodes and emeria in different sex

Prevalence of gastro-intestinal nematodes and emeria in the current study was not age dependent. That means, there is no any significant relation between sex of animals and occurrence of parasites (*P*= 0.285). This may be because of similar management under the same environmental condition of the two sexes in this zone.

Table 4. Prevalence of gastro-intestinal nemathods and emeria according to sex in west Arsi zone

Sex	No.	Positive results (%)
Male	159	83 (52.2%)
Female	225	105 (46.7%)
Total	384	212 (49

X^2= 1.142 *; P*= 0.167

Out of 384 animals examined 159 animals were male and the rest 225 animals were female from the above table From 159 male animals examined 83(52.2%) animals were positive for GIT parasites and out of225 female animals examined 105(46.7%) animals were positive for GIT parsites.

Prevalence of gastrointestinal nematodes and emeria within different breeds

Breed of animals have significant effect on the occurrence of gastro-intestinal nematodes and emeria (P= 0.000). This relation may occur due to higher resistance of local and cross-breeds of cattle than pure exotic breeds.

Table 5. Rate of infection with different gastro-intestinal nematode and coccidian with breed in west Arsi zone

Breed	No. examined	Positive results (%)
Local	301	131 (43.52%)
Exotic	30	23 (76.66 %)
Cross	53	34 (64.15 %)
Total	384	188 (49%)

X^2= *17.67 ; P*= 0.000

From the above table Out of 384 animals examined 301 animals were local breeds of cattle, 30 exotic castles and 53 were cross breeds. Out of which 131/301 (43.5%) local cattle were positive for GIT parasites, 23(76.7%) exotic cattle were positive for GIT parasites and 34(64.2%) cross breeds were positive for GIT parasites.

Prevalence of gastrointestinal nematodes and emeria within different body conditions

As shown in the table.6 below body condition of the animals was also considered during examination and animals were divided in to three body condition scores as shown in the above table. These are good, medium and poor. Out of 384 animals examined 188 animals were in good body condition, out of which 70 (37.2%) animals were positive for GIT parasites, 70 animals were in medium body condition and out of these 39 (55.7%) animals were positive for GIT parasites and the rest 126 animals were in poor body condition state and out of these 79 (62.7%) animals were positive for GIT parasites. These result shows that body condition have a significant relation with body condition score (*P*= 0.000). That means body condition of animals have strong relation with presence of gastro intestinal parasites. This result might be seen due to blood sucking nature of gastro-intestinal parasites of cattle, most of the time they lids to decrease body condition of animals and this is why they have significant relation with body condition of animals.

Table 6. Infection of Gastro intestinal parasites within different body conditions in west Arsi zone, 2004 E.C.

X^2=21.1*; P*= 0.000

Body condition	No.	Positive results (%)
Good	188	70 (37.2%)
Medium	70	39 (55.7%)
Poor	126	79 (62.7%)
Total	384	188

Prevalence of gastro-intestinal nematodes and emeria in relation with history of deworming

During examination of animals deworming History were also considered. Among 384 animals sampled 288 animals were dewormed and the rest 96 animals were not dewormed previously. Out of 288 animals that were dewormed 119 (41.3%) were positive for gastro-intestinal parasites, out of 96 animals not dewormed before sampling 69 (71.9%) animals were positive for gastro-intestinal parasites. In this result deworming of cattle have a significant relation ship with the occurrence of gastro-intestinal nematodes (*P*= 0.000), as shown in the table.7 below dewormed animals have lower rate of infestation with GIT parasites as compared with non dewormed cattle.

Table 7. Prevalence of gastro-intestinal nematodes and emeria in relation with deworming history in cattle of west Arsi zone

History	No. of animals	Prevalence (%)
Dewormed	288	119 (41.3%)
None Dewormed	96	69 (71.9%)
Total	384	188 9%)

X^2=26.9*; P*= 0.000

Prevalence of gastro-intestinal nematodes and emeria in relation with presence of diarrhea

Animals were also grouped into two groups depending up on history of diarrhea (present or absent) out of total number of animals examined 261 animals were showing signs of diarrhea out of which 138 (52.9%) were positive for GIT parasites and 123 non diarric animals 50 (40.4%) were positive for GIT parasites. This result also shows that presence of diarrhea has significant relation with the occurrence of gastro-intestinal nematodes and coccidian (*P*= 0.017). This result was seen may be as a result of many of gastro-intestinal nematodes and coccidian are courses for diarrhea.

Table 8. Prevalence of gastro-intestinal nematodes and emeria in relation with presence of diarrhea

Diahrria	Number of sample	Positive results
Present	261	138 (52.9%)
Absent	123	50 (40.4%)
Total	384	49.9%

Rate of gastro-intestinal Nematode parasites and coccidia infestation identification

Both Single and mixed infection of gastro-intestinal nematodes and coccidia was identified in current study. The first being higher in proportion 109/188 (57.97%) and 79 (42.02%) with mixed infection.

Rate of single gastro-intestinal parasites and coccidia infection identified

Out of 188 positive results seen 109/188 animals were infected with single parasites with total prevalence of 57.97% these infections include Ostertagia spps 7 (1.8%), Oesophagostomum spps 5 (1.3%), strongloid spps 10(2.6%), Emeria spps 11 (2.9%), Trychostrongylus spps 14(3.6%), Hemonchus spps 45(11.7%), and Bunostamum spps 17 (4.4%) as shown in table 7 above. Among single parasitic infestations observed in current study hemonchus sps are most dominant. And the list number of single parasitic infestation parasitic infestation was observed in ostertagia species.

Table 9. Rate of single gastro-intestinal Parasites and coccidia infection identified

Parasite	No.	Percentage %)
Ostertagia spp	7	1.8%
Oesophagostomum spp	5	1.3%
Strongloid spps	10	2.6%
Emeria spps	11	2.9%
Trychostrongylus spps	14	3.6%
Hemonchus spps	45	11.7%
Bunostomum spps	17	4.4%
Total	109	57.97%

Rate of mixed infections of gastro intestinal nematodes parasites

As shown in the above table the out of 188 infested animals total prevalence of mixed infection was 42.02% nthese includes; *Oesophagostomum spp* with *Trychostrongylus spp* 37(9.6%), *Ostertagia* with *Hemonchus spp* 15(3.9%), *Trychostrongylus* with *Hemonchus spp* 17(4.4%), and 10(2.6%) were mixed infection by *Strongloid* with *Bunostomum* were seen. But there were no mixed infections seen with more than two parasites.

Table10. Rate of mixed infections with gastro-intestinal nematodes parasites in west Arsi zone, 2004 E.C.

Body condition	No.	Percentage %)
Oesophagostomum spp with *Trychostrongylus spp*	37	9.6%
Ostertagia spp with *Hemonchus spps*	15	3.9%
Trychostrongylus spp with *hemonchus spps*	17	4.4%
Strongloid with *bunostomum spps*	10	2.6%
Total	79	42.02

Rate of infestation of gastro-intestinal parasites and coccidia compared with availability of communal grazing and watering land

As shown in table.9 the other risk factor considered were availability of communal grazing and watering points. Out of 384 animals examined 225 animals were had access to communal grazing and watering points out of which 142 (63.1%) animals were positive for GIT parasites. Out of 188 animals positive for GIT parasites in west arsi zone 76 (59.4%) animals were from Arsi negele district, 73 (57%) animals were from shashemene district and 39 (30.5) animals were from Kofele district. Availability of communal grazing and watering points has significant relation (P= 0.000) with prevalence of gastro-intestinal nematodes and coccidia infestation. This association may be due to mixing of different herds at communal grazing and watering points, facilitate transition of gastro-intestinal parasites among different herds.

Table11. Rate of infestation of gastro-intestinal parasites compared with availability of communal grazing land

Districts	Communal Grazing lands (No.) and watering	Positive results (%)
Arsi negele	95	74.2%
Shashemene	98	76.6%
Kofele	32	25%
Total	225	58.59%

X^2= 43.55 ; P= 0.000

Discussion

Epidemiological investigation of nematodes in livestock using suitable and cost effective diagnostic methods is found to be important. Thus, the overall 49% animal positive for nematode & coccidian shows the prevalence of nematodes and emeria in this zone. Moreover, the significance of the nematodes was found to be higher in young and adults than in calves by floatation. This concomitant increase in the prevalence with age of animal could be due to increase in the frequency of contact with age and management factors. This result was lower than (58.00%) prevalence (Shirale, *et al.,* 2003). And 54% (Adem and Anteneh, 2011) in Haramaya University dairy

farm. Lower prevalence of gastro-intestinal nematode in the present study could be due to the fact that deworming of cattle is done by field veterinarians, Para-veterinarians and farmers themselves. But the prevalence of gastro-intestinal parasites in current study is higher than 11% (Ashutosh *et al,* 2011). This difference may occur due to difference in management system of cattle in these two different areas and the sample they took was low (100) as compared to current study (384) which was representative for current study population.

Out of 384 samples examined 188 were found positive. Of these 109(57.98%) had single and 79 (42.02%) had mixed infection with different nematode species. (Ahmed, 2005) observed higher percentage of single infection (65.20%) than mixed (2.51%) and (Shirale, *et al.,* 2003) observed (60.29%) single and (6.00%) mixed infection. This similarity may be due to similarity in the two agro ecological zones and similarity in study design.

In this particular study prevalence of gastro intestinal nematode's and coccidian was different among different age groups. Higher prevalence of gastro intestinal parasites was seen in young (60.2%) and adult (52.2%) animals have than calves (23.6%). Prevalence of gastro-intestinal nematode's and coccidian in calves (23.6%) was less than 56.25% (Bilal, *et al.,* 2009). This difference is may be due to different management system or due to increase in awareness of the farmer to treat their animals with antihelmentic drugs and this result were lower than the finding of (Adem and Anteneh, 2011) which is 18, 57 and 62% prevalence in calves, heifers and adult, respectively. This difference could be due to difference in susceptibility between exotic cattle and local breeds.

Hemonchus spp have the highest proportion (11.7%) among all parasites identified in the current study. This result is similar with the result 11.6% by (Adem and Anteneh, 2011) at Haramaya University dairy farm. This similarity of result could be due to similarity in agro climatic condition of the two areas and similarity in management system of the two areas and also it could be due to uniform distribution of *Hemonchus* spp parasite in these two areas. This result was higher than (6.57%) (Shirale, *et al.,*2003). In the current study the prevalence of *coccidia* spp is 11 (2.9%) and (Shirale, *et al.,* 2003) 11 (3.14%) found nearly the same result with current study.

In current study Trychostrongylus sp was 14 (3.6%) this result is nearly similar with the finding of (Shirale, *et al* 2003) which was 17 (4.85%). These similarities could be due to similarity of agro-ecology of the two areas and similarity in management system.

In the current study the prevalence of *Trychostrongylus* spp is about 3.6 5 this result was extremely lower than the result of (Adem and Anteneh, 2011) which was 37 % at Haramaya university dairy farms. This higher difference in the prevalence of *Trychostrongylus* spp in this two areas could be difference in periodic deworming of cattle in these two areas. In west Arsi zone about 75 % of the farmer's used to deworm their herds as shown in the previous section (section, table 7) and it might be also due to higher susceptibility of exotic cattle than local breeds.

In the current study the prevalence of *oesophagostomum* was found 1.3 % which was lower than (11%) by (Adem and Anteneh, 2011) in Haramaya university dairy farm. This difference could be due to difference in deworming habit of farmers in west Arsi zone and higher susceptibility of exotic cattle than local breeds.

In this particular study the prevalence of mixed infection with *Trichostrongylus* and *Haemoncus* was 4.4% incattle's of west Arsi zone which was was nearly similar with the finding of (Adem and Anteneh, 2011) which was about 6.4%. This similarity could be due to similarity in the two agro-ecological zones and similarity in the two study methodology.

Conclusion and Recommendation

The present study disclosed that gastrointestinal nematodes and coccidia infection in cattle is spread throughout study area with prevalence of 188/384 (49%). Among the seven genera of GIT helminth parasites investigated, *Hemonchus* spp egg (11.7%) was found to be the most prevalent parasite in west Arsi zone, whereas *ostertagia* spp *(1.8%)* was the least prevalent gastro-intestinal nematode. Most risk factors such as age, deworming history, availability of communal grazing land, breed of animals, body condition and different districts have significant relationship ($p< 0.05$) with the presence of parasitic infection. In the current work, the prevalence of mixed infections with two parasite species in the same host was found to be 79/188 (42.02%). Generally, although, most owners in the study area were aware of treating their cattle against gastrointestinal helminthes, most of the treatments are given by themselves by buying from market without any prescription by veterinarians or assistants and this may contribute to the current higher overall prevalence of gastro-intestinal helminthes in study area. On top of that, there was also lack of veterinary service in the community which to a large extent contribute for wide spread of the parasites. So to minimize the wide spread prevalence of this parasitic problem in the study area the following actions should be taken:

- Periodic deworming of cattle against helminthes should be practiced strategically so as to overcome further spread of the parasites.
- Awareness creation campaign should be conducted by all stakeholders about the effect of drug resistance as the farmers treat their animals with antihelmentic drugs without prescription by veterinarians.

- Veterinary services should be expanded.
- The use of communal grazing and watering points should have to be reduced as they are the principal means of transmission of parasites from one herd to the other.
- Over stocking and use of manure as a fertilizer of pasture land have to be reduced.
- Further investigations should be conducted in order to render more detail information about gastrointestinal parasites of cattle in the study area, so as to put appropriate control and prevention measures in place.

References

[1] 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.

[2] Anwar A, Buriro S, and Phulan A (1995). A hydatidosis veterinary perspective in Pakistan. *The Veterinarian*. Pp. 11-14.

[3] 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.

[4] Bilal, M, Hameed A, and Ahmad T (2009). Prevalence of gastrointestinal parasites in buffalo and cow calves in rural areas of toba tek singh, Pakistan. *The Journal of Animal & Plant Sciences* 19(2): Pages: 67-70: 1018-7081 67.

[5] Central Agricultural Census Commission (2003). Ethiopian agricultural sample enumeration, 2001/02(1994 E.C.). Results for Tigray Region Statistical report on livestock and farm implementations, Part IV. Pp. 29-43. Addis Ababa, Ethiopia.

[6] 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.

[7] 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.

[8] Tesfaye T (2009). 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. M.Sc Thesis presented to the the Department of Animal Science, School of Graduate Studies,Haramaya University, Haramaya, Ethiopia.

[9] Irfan, M.(1984). Key note address on effects of parasitism in lowering livestock population. Pakistan *Vet. J*., 4(1): Pp. 25-27.

[10] Keyyu J, Keyvsgaar N, monrand J, and kassuku A (2005): Epidemiology of gastrointestinal nematodes in cattle on traditional, small scale dairy and large fams in Iringa-district, Tanzania. *Veterinary Parasitology*. 127: Pp. 285-294

[11] Ministry of Agriculture (2013): Major Challenges and Achievements in Ethiopian Livestock Production

[12] Shaw D, Ercusse, J, Angessens J, and Dorny P (1997): Gastrointestinal nematode infectious of first season grazing calves in Belgium: general patterns and the effect of chemo prophylaxis. *Veterinary parasitology*. 69: Pp. 103-116.

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

[14] Solomon B (1994): Privatization of animal health service Sub-program proceeding of the 18th annual conference of Ethiopian veterinary Association, Addis Ababa Ethiopia.Pp. 56-6.

[15] Swai E, Mitui. P, Mbise A, Kaaya E. Sank P, and loomu, P, (2006): prevalence of gastropintestinal parasites infection in maasai cattle in Mygorongora District, Tanzania. *Livestock Research for rural Development*. 18(8): Pp. 1-11.

[16]Tekele B (1991): Epidemiology of endo-parasites of small ruminants in sub Saharan Africa, Proceeding of fourth National Livestock Improvement conference. Addis Ababa, Ethiopia; Pp. 13-15.

[17] Thrusfield, M (1995): veterinary epidemiology, second Ed. Blackwell science Ltd. Cambridge. Pp: 274-287.

[18] Yohannes A (2002): Background information on Contagious Bovine pleuropneumonia in Ethiopia.

[19] Yayneshet T (2010) : Feed resource availability in Tigrai Region, Northern Ethiopia, for Production of Export Quality Meat and Livestock. PHD Dessertation, Mekelle Universit, Ethiopia.

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