academicresearchJournals

Vol. 6(5), pp. 260-265, June 2018
DOI: 10.14662/ARJASR2017.080

ISSN: 2360-7874
http://www.academicresearchjournals.org/ARJASR/Index.htm

Academic Research Journal of Agricultural Science and Research

Full Length Research

Prevalence of GIT Parasites and associated risk factors in Cattle of Lume, Bora, Dugda and Adamitulu Jido Kombalcha districts of East Shewa Zone

Shibiru Diriba[1] and Dereje Tulu[2]*

[1]Jimma Zone Livestock Development and Fishery Office, P. O. Box: 166, Jimma, Ethiopia.
[2]Tepi Agricultural Research Center, P.O.Box:34. Tepi, Ethiopia.
*Corresponding author. E-mail:derejetulu5@gmail.com

Accepted 21 May 2018

A cross-sectional study was carried out from November 2015 to November 2016 to investigate the prevalence and associated risk factors of gastrointestinal parasites of cattle in four districts of east Shewa zone. Fecal samples were examined by using simple flotation techniques. Out of 384 cattle examined 157 (40.9%) were found positive for at least an egg or more of some of parasites belonging to Strongyle, Trichuris, Toxocaravitulorum and/or oocytes of some protozoa. Moreover there was no significant variation (x^2=6.61; P>0.05) between districts in finding positive cattle considering the distribution of parasite groups. Based on fecal egg findings, the relative importance of parasites was recorded as Eimeria species, Toxocaravitulorum, Strongyle, Strongyloides species, Trichurisglobulosa and cryptosporidium species in the order of 47.8%, 0.6% 14.0%, 1.3%, 5.1% and 31.2% respectively. Other factors like age category and sex did not show significant variation while body condition was associated with gastrointestinal parasites infections (p< 0.05) were also detected at a considerable rate in cattle despite their history of deworming. No significant variation (P>0.05) was observed to have effect on the infection between cattle based on history of deworming. Considering the current study, gastrointestinal parasites comprising of nematodes and protozoa are common in Lume, Bora, Dugda and Adamitulu Jido Kombalcha districts and pose serious constraints to cattle rearing in the area that necessitate education of farmers. Hence, it is recommended that farmers and extension officers should be educated on the importance of using the right anthelminthic products at the right time in order to improve the economy of farmers keeping cattle in the area.

Keywords: - Gastrointestinal parasites, prevalence, risk factor, cattle, East Shewa

Cite this article as: Diriba S, Tulu D (2018). Prevalence of GIT Parasites and associated risk factors in Cattle of Lume, Bora, Dugda and Adamitulu Jido Kombalcha districts of East Shewa Zone. Acad. Res. J. Agri. Sci. Res. 6(5): 260-265

INTRODUCTION

Ethiopia livestock population has reached to 52 million cattle, 33 million sheep, 30 million goats and 2.5 million camels and it is the largest in Africa (CSA, 2016). However, the contribution from this huge livestock resource to the national income is disproportionately small, owing to several factors. Diseases are among the factors responsible for poor production and productivity (MOA, 2010). Parasitic diseases are considered as a

major obstacle in the health and product performance of livestock. Gastrointestinal tract(GIT) infections are worldwide problem for both small and large scale farmers but, their impact is greater in sub-Saharan Africa in general and Ethiopia in particular due to availability of a wide range of agro-ecological factors suitable for diversified host and parasite species. The infections of these parasites are the cause of losses of productivity (Holmes, 1985; Labbie *et al*., 1994; Vercruysse and Claerebout,2001).

A number of helminths species are known to infect cattle worldwide. The most important ones include nematodes like Strongyle species (Haemonchus, Ostartagia, Trichostrongylus, Cooperia) and trematodes of economic importance Fasciola species (Fasciola hepatica and Fasciolagigantica) and Paraphistomum species (Paraphistomumcervei), while cestodes like Monezia species (Moneziabenideni and Moneziaexpanza) could also be important constraints in animal production (Onah and Nawa, 2000; Telila et al., 2014).

The prevalence of GIT parasites, the general of helminthes parasites involved, species and severity of infection also vary considerably depending on local environmental condition such as humidity, temperature, rainfall, vegetation and management practice (Tekle,1991).Among the predisposing factors of intestinal parasite infections are climate, nutritional deficiency, grazing habit, immunological status, pasture management presence of immediate host and vector and the number of effective larvae and eggs in the environment (Radostits *et al* .,2007).Damages inflicted to the health and productivity includes loss in body weight , poor reproductive performance, digestive disturbance and emaciation for longer period (Radostits e*t al* .,2007).So it is important to control internal parasites through better management as in developed countries and knowledge on prevalence of these parasites is mandatory .

There are many associated risk factors influencing the prevalence and severity of GIT helminths. These include age, sex, weather condition and husbandry or management practices (Khan et al., 2009). Gastro-intestinal infection is one of the most prevalent diseases of ruminants in Ethiopia. A study conducted in and around Holleta indicated that the overall prevalence parasitic infections of cattle were 82.8%. The predominant helminths egg identified were trematodes (*Fasciola* and *Paraphistomum*spp.) 80.6%, *Strongyles* 66.25%, mixed infection (trematodes and *Strongyles*) 63.12%, while others such as *Trichuris* and *Monezia*1.5% (Etsehiwot, 2004). Other study conducted on gastrointestinal (GI) parasite of ruminants in Western Oromia also showed that the overall prevalence of GIT parasites was 69.6% in cattle with predominant prevalence of *Strangles* and *Eimeria* parasite (Regassa et al., 2006).

These reports of from different parts of the country indicated that livestock production is constrained by GIT parasites. However, such information lacks in the present study area. Therefore, the objectives of this study were to estimate the prevalence of GIT parasites and associated risk factors in cattle of four districts of East Shewa Zone.

MATERIALS AND METHODS

Study area

The study was conducted in east Shewa zone of Adamitulujidokombalcha, Lume, Dugda and Bora districts. Adamitulujidokombalcha district is part of rift valley that lies between 130-180km south of Addis Ababa and the altitude ranges between 500-1800 meters above sea level. The area has an annual rainfall ranging between 500-900mm.The rainfall is with short rainy season from March to May and long rainy season from June to September, followed by the dry season from October to February. The area has an average maximum and minimum temperature of 27 ^{0}c and 12^{0}c respectively and relative humidity of 60%.Dugda and bora are located at about 134km south of Addis Ababa. The long rainy season in the area is between June and October, while the long dry season lasts from October to February. The minimum and maximum temperatures in the area range from 14 to 27^{0}c. The average altitude is 1650 above sea level, with an average rainfall of 716mm (Ebro *et al*., 1998). Lume district is located in eastern Shewa Zone of Oromiya. It is also located 70km southeast of Addis Ababa 8^0 35'N and 39^{0}10' E at an altitude of 1777 meters above sea level. The average maximum and minimum temperature is 28^{0}c and 18^{0}c respectively. The total area of Lume district at is 752km^2, of this 60km^2 is covered by water. The climatic condition of the area includes dega (high land (80%), woinadega (medium land) middle altitude (45%) and kola (low land (Ezana, 2008).

Study Animals and Study Design

The cross-sectional study was conducted from November 2015 to November 2016 to estimate the prevalence associated risk factors of GIT Parasites in four districts of east Shewa zone. The study was included calves, young and adult cattle found. The study animals were local breeds of cattle kept by farmers in the area where mixed crop-livestock production system is practiced. Moreover, cross cattle were also assessed.

Sample size and sampling method

East Shewa zone was selected purposively while kebeles and villages were selected randomly from each district.

Simple random sampling method was followed to select the study animals. The numbers of animals to be sampled from each Kebele were determined by the proportion of the cattle population existing in each Kebele. Animals within the villages were selected using simple random sampling. It was computed was followed to collect feces from the individual animals. Since there was no previous in study area, the sample size was determined by taking the 95% level of confidence (CL), 5% desired level of precision and expected prevalence of 50%,the sample sizes was calculated using the formula given by Thrusfield (2005).

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

n = required sample size, Pexp = expected prevalence, d =desired absolute precision
Therefore, based on the above formula the total sample sizes of cattle were calculated tobe 384.

Study Methodology

Fecal samples were collected directly from the rectum of calves, young and adult at particular time. In cases where retrieval from rectum was not possible, top layer of freshly voided feces was taken and placed into labeled plastic container. After collection and preservation in ice box, samples were transported to Adamitulu Agricultural Research Center laboratory for investigation. Those samples which were not examined within 24 hours of arrival were stored at 4^0c and examined the next day early in the morning. The breed, the body condition scores, date and age of animals were recorded on the format prepared. Floatation technique was employed to detect parasite eggs and the results were registered as Strongyle, Trichuris or Toxocara eggs etc. Briefly, three grams of the fecal material were homogenized in 42 ml of sodium chloride solution (200g in 500ml of H_2O) which makes a final volume of approximately 45 ml. A portion of this was filled in a tube and a cover glass was then placed on top of the tube for 10-15 minutes. The cover glass was then removed vertically and placed on a slide and examined under the microscope (Urquhart *et al.,* 1996).

Data management and analysis

After the collected data were uploaded to Microsoft Excel 2010 computer program, it was coded and imported to STATA for windows version 11.0. The data was then summarized by using tables, percentages (proportions) and 95% confidence intervals. Moreover, the effects of different epidemiological risk factors were analyzed by applying x^2-test. Statistical significance was set at $p<0.05$.

RESULTS

Prevalence and risk factors

Out of 384cattle examined, 157(40.9%) were found positive for at least an egg or more of parasites belonging to Strongyle, Trichuris, Toxocaravitulorum and /or oocytes of some protozoa. Based on the result of fecal finding, egg of parasites detected belong to nematodes like Trichuris (5.1%), Strongyle (14.0%), Toxocaravitulorum (0.6%) and Strongyloidespapillosus (1.3%) as well as protozoa of Eimeria species (47.8%) and cryptosporidium species (31.2%).Moreover, there was no significant variation ($X^2=6.61$; $p>0.05$) between districts in finding positive cattle considering the distribution of parasite groups. The highest (47.6%) and lowest (31.0%) prevalence of GIT parasites was recorded in Lume and Dugda districts (Tables 1).

Out of 157 cattle detected positive, 54(42.5%) were calves, 49(38.3%) young and 54(41.9%) belong to adult age groups. No significant variation ($p>0.05$) was observed between age category and fecal egg findings (Table 2).

Out of 157 positive cattle 65(39.9%) were males and 92(41.6%) females with no significant variation ($x^2= 0.12$; $P > 0.05$) between sexes on fecal egg findings (Table 3).

Out of 157 cattle found positive for fecal egg detections, 38(31.7%) had good body condition score, 50(38.2%) medium and 69(51.9%) poor body conditions. Moreover, there was significant variation ($x^2=12.03$; $p<0.05$) when cattle in poor and good body conditions were considered in finding fecal eggs (Table 4).

From the findings of questionnaire, some farmers indicated that they deworm their cattle when drugs are available and others do not at all. However, infections were detected at a considerable rate in both cattle despite their history of deworming. No significant variation ($p>0.05$) was observed to have effect on the infection between based on history of deworming (Table 5).

DISCUSSION

The current study revealed that the prevalence of gastrointestinal parasite infections in cattle in four districts of East Shewa zone is 40.9%.This result agrees with the result of previous works by Bacha and Haftu (2014), Epherem(2007) and Keyyu et al. (2006) were they reported prevalence of gastro-intestinal parasite of 41.2% in western Amhara region,49.0% in west Arsi, Ethiopia and 44.4% in large dairy cattle in Tanzania, respectively. On the other hand, the prevalence of gastro-intestinal parasite reported in the current study is less than the

Table 1: Fecal parasite egg findings in cattle from four districts of east Shewa zone

Districts	Number of cattle Examined	Number of cattle positive	prevalence%	95% CI
Dugda	87	27	31.0	21.1-40.9
Bora	93	43	46.2	35.9-56.6
Lume	90	43	47.6	37.3-58.3
ATJK	114	44	38.6	35.9-45.8
Total	384	157	40.9	35.9-45.8

X^2 6.61; p=0.085

Table 2: Fecal parasite egg findings in different age groups of cattle in four districts of east Shewa zone

Age category	Number of cattle Examined	Number of cattle positive	prevalence%	95% CI
Calves	127	54	42.5	33.8-51.2
Young	128	49	38.3	29.7-46.8
Adult	129	54	41.9	33.2-50.5
Total	384	157	40.9	35.9-45.8

X^2=0.55; p=0.76

Table 3: Fecal parasite egg findings in different sex groups of cattle in four districts of east Shewa zone

Sex group	Number of cattle Examined	Number of cattle positive	prevalence%	95% CI	P –value
Male	163	65	39.9	32.3-47.5	x^2; 0.12 p =0.73
Female	221	92	41.6	35.1-48.2	
Total	384	157	41.9	35.9-45.9	

Table 4: Fecal parasites egg findings based on body condition of cattle in four districts of east Shewa zone

Body condition	Number of cattle Examined	Number of cattle positive	prevalence%	95% CI	P –value
Good	120	38	31.7	23.2-40.1	
Medium	131	50	38.2	29.7-46.8	X^2;12.03; 0.007
Poor	133	69	51.9	43.3-60.5	
Total	384	157	40.9	35.9-45.8	

Table 5: Frequency of cattle deworming and fecal egg findings in four districts of east Shewa zone

Frequency of deworming	Number of cattle Examined	Number of cattle positive	prevalence%	95% CI	P –value
When available	168	64	38.1	32.3-47.5	
Not at all	216	93	43.1	35.1-48.2	X^2=0.962;P= 0.327
Total	384	157	40.9	35.9-45.9	

values reported by Regassa et al. (2006)50.2% from western Ethiopia, Derib (2005) 50.8% from Bahir-Dar and its surrounding, Tulu and Lelisa (2016)50.08% in West Hararghe zone and Telila et al. (2014) 61% in East Showa Zone. The higher prevalence was also reported by Etsehiwot (2004) to be 82.8% in Holleta and its surroundings. The prevalence difference in different study area may be resulted from difference in management system, topography, deworming practices, and climatic condition that favors the survival of infective stage of the parasite and intermediate hosts. Detections of parasite eggs or oocytes with such a level of infection especially during dry period could suggest the existence of suitable climatic conditions throughout the year for the development and survival of free-living stages in the study area. Likewise, it could also be due to lack of regular deworming practice, administration of incorrect dose, inferior quality or high cost of the drugs used in the area for treatment of animals. Hence, parasite eggs were detected at a high frequency in fecal samples collected from all four districts studied.

This work also demonstrated that there was no

variability regarding infection based on fecal egg finding in relation to district, age and sex of animals considered as risk factors. This could be due to more or less similar environmental conditions shared by the districts as well as the practice of grazing animals on the same pasture regardless of age and sex groups. However, the effect of body condition has to manifest variation that animals with poor body condition had a higher frequency of gastrointestinal parasite infections. There was significant difference among body condition and prevalence of gastrointestinal parasite which was higher in thin animals and lower in animals with good body condition. This study finding is in line with reports of Telila et al. (2014),who reported that significant association between prevalence of gastrointestinal parasite and body condition in East Showa Zone. However, this finding contradicts with the findings of Manaye (2002) who reported absence of significant difference on the prevalence of helminths in animals of different body condition.

In this study, it was attempted to evaluate the relative frequencies of occurrence different parasite groups based on fecal egg findings. To this effect, 14.0% infections were due to Strongyle, 5.1%Trichurisglobulosa, 47.8% Eimeria species, 31.2% Cryptosporidium species, 0.6% Toxocaravitulorum and 1.3% strongyloidespapillosus. The effects of these infections can be evident by the frequent drought that occurs in some of the study areas. This is described as the most economically important form of infection since it occurs in most of the cases leading to thriftiness and animals are more susceptible to other infections (Ocaido *et al*., 1996).

The prevalence of infection by Eimeria species (47.8%) is higher than the previous reports in the country 24.9% (kassa et *al*. (1985), 20% (kebadu, 1998); but lower than 68.1% (Rahmeto, 2005). The observed difference could be attributed to the difference in the management situations like feeding, housing and watering and hygiene status of animals. The medium prevalence of cryptosporidiosis observed in this study as well as in many other similar studies is partly attributed to the type of design employed in studying the problem and may under estimate the prevalence because oocytes may be shed for only a few days (Casemore *et al*., 1997; McCluskey *et al*., 1995) consequents they there was a possibility of missing cattle that were infected at sampling.

CONCLUTION AND RECOMMENDETIONS

The prevalence of GIT parasites in the cattle in the current study area was generally high. However the findings of parasites like Eimeria species, Cryptosporidium species, Strongyle and Toxocaravitulorum in cattle warrants the need for adoption of control and prevention measures because these parasites can interfere with the growth and reduced life time of productively. This study also identified that body condition as risk factor for GIT parasites in cattle. Worm control programs should be coupled with a significant improvement in nutrition and management in order to achieve the envisaged economic benefits. A strategy for worm control has to be designed and implemented. This must consider the option for stopping illegal markets, impose quality control schemes, create awareness about when, where and why to treat animals, utilize epidemiological information for planning the control programs, improve nutrition and management system and the possible economic return from the control activity. It is also recommended that further investigation has to be carried out on the status of anthelminthic and anti-protozoan resistance in the area.

REFERENCES

Bacha A, Haftu B (2014). Study on Prevalence of Gastrointestinal Nematodes and Coccidian Parasites Affecting Cattle in West Arsi zone, Oromia Regional State, Ethiopia. J Veterinar Sci Technol. 5: 207.

Casemore DP, Wright SE , Coop R L (1997). Crysporidiosis-human and animal epidemiology, In: Fayer, R. (Ed), cryptosporidium and crysporidiosis. CRC press, Boca Raton, pp. 65-92.

Central Statistical Agency (CSA) (2016). Livestock and Livestock Characteristics, Agricultural sample Survey. Addis Ababa, Ethiopia. Statistical Bull. 2(583):9-13.

Derib Y (2005). The study on endoparasites of dairy cattle in Bahir Dar and its surroundings, DVM, Thesis, Addis Ababa university, Debrezeit, Ethiopia.

Ebro A, Eticha G, Hussen A (1998). Thirty years of research experience of Adamitulu Agricultural research center: Agricultural Research Condition Service Oromia.

Epherem W (2007). Prevalence of Bovine GI helminths in selected Dairy farms of Addis Ababa.DVM Thesis, Jimma University, Jimma, Ethiopia.

Etsehiwot W (2004). A Study on Bovine GIT Helminths in Dairy Cows in and Around Holleta, DVM thesis, FVM, AAU, DebreZeit, Ethiopia

Ezana A (2008). Major disease of export oriented livestock in export abattoirs in/around ADALLBEN Woreda, Debre-Zeit: Faculty of veterinary medicine, Addis Ababa University, DVM Thesis.

Holmes PH (1985). Pathogenesis of Trichostrongylosis .vet. Parasistology, 18: 89-101.

Kassa B, Delgado A, Asegedech T, (1985).An outbreak of Coccidiosis in cattle Ethiopian veterinary bulletin.

Kebadu S (1998). Study on cattle diarrhea in small-scale dairy forms at Debre-Zeit. DVM Thesis, FVM ,AAU ,Ethiopia.

Keyyu JD, Kassuku AA, Msaliilwa PL, Monrad J, Kyvsgaard NC (2006). Cross-sectional Prevalence of Helminth Infections in Cattle on Traditional, small-scale and Large-scale Dairy Farms in Iringa District, Tanzania. Vet Res Commun. 30: 45-55.

Keyyu JO, Monrad J, Kyuspaard MC, Kassuku AA (2005). Epidemology fasciola *gigantica* had *Amphistomes* in cattle on traditional small scale dairy and large scale dairy farms in the southern highlands of Tanzania, tropical animal health and production 37:303-314.

Khan SM, Ijaz, MA, Shraf K, Ali MM, Khan MZU (2009).Infection Rate and Chemotherapy of Various Helminthes in Diarrheic Sheep in and Around Lahore, Department of Clinical Medicine and Surgery, University of Veterinary and Animal Science, Lahore. J. Anim. Plan. Sci. Pakistan., 19, 13-16.

Labbie SHB, Rey B, Irungu EK (1994). Small ruminant research and development in Africa, proceedings of the second biennial conference of Africa Small ruminant research Network. ILCA, 1-5.

Maing N, Gichipi MN (1992). Gastro-intestinal nematodes in cattle on four farms in Nyandaruna districts, Kenya, Bulletin animal health production Africa 40:9-10.

Manaye MU (2002). Study on Bovine Gastrointestinal Helminthes in Asella and Surrounding Highland Area. DVM Thesis, FVM, AAU, DebreZeit, Ethiopia.

McCluskey BJ, Greiner EC, Donovan GA (1995).Patterns of cryptosporidium Oocysts shedding in calves a comparison of two diagnostic methods. Vet. Parasitol 60:185-190.

MOA (2010).Ethiopian animal health Yearbook 2009/10.Animal and plant health regulatory Directorate, Ministry of Agriciulture. Addis Ababa, Ethiopia.Pp.54.

Ocaido M, Sectert L, Baranga J (1996). Disease surveillance in mixed livestock and Games are around Lake Mburo National park in Uganda, South Africa journal of wildlife research 26:133-135.

Onah DN, Nawa Y (2000). Mucosal Immunity Against Parasitic Gastrointestinal Nematodes. Korean J. Parasitol. 38: 209-236.

Radostits OM, Gay CC, Hinclclift KW, constable PO (2007).Veternarymedicine.A textbook of disease of cattle, sheep, pigs, goats and horses.10th ed.W.B. Saunders, London,Pp. 1498-1563.

Rahmeto A (2005). An epidemiological study on major protozoa causes of calf diarrhea on selected dairy farms of control Ethiopia Master of Science, FVM, AAU, Ethiopia.

Regassa F, Teshale S, Reta D and Yosef K (2006). Epedemiology of Gastrointestinal Parasite of Ruminants in Western Oromia, Ethiopia. Int. J. Appl. Res. Vet. Med. 4:51-56.

Tekle B (1991). Epidemiological endoparasites of small ruminants in Sub-Saharan Africa. Proceeding of fourth national livestock improvement conference. Addis Ababa,Ethiopia,13-15.

Telila C, Abera B, Lemma D, Eticha E (2014).Prevalence of gastrointestinal parasitism of cattle in East Showa Zone, Oromia Regional State, Central Ethiopia.J. Vet. Med. Anim. Health, 6(2):54-62.

Thrusfield (2005). Veterinary epidemiology 2nd ed.Black well science UK.Pp.178-198.

Tulu D, Lelisa K (2016). A Study on Major Gastro-Intestinal Helminths Parasites of cattle in Tulo District, West Hararghe Zone, South-Eastern Ethiopia. Austin J Vet Sci and AnimHusb. 3(2): 1027.

Urquhart GM, Armor J, Duncan JL, Dunn AM, Jennings W (1996). Veternary parasitology.2nd ed.Black well science Pp.4-250.

Vercruysse J, Claere about E (2001).Treatment vs non treatment of helminthes infection in cattle; defining the threshold, Veternary parasitology,98:195-214.