G.J.B.B., VOL.7 (2) 2018: 286-290 ISSN 2278 – 9103

GLOBAL JOURNAL OF BIO-SCIENCE AND BIOTECHNOLOGY

www.scienceandnature.org

PREVALENCE OF GASTROINTESTINAL HELMINTHES IN CATTLE OF BAGHDAD CITY

*Malak Ali Fadhel & May Hameed Kawan
Parasitology Department, College of Veterinary Medicine, Baghdad University, Baghdad, Iraq
*Corresponding author email: vetmeme93@gmail.com

ABSTRACT
This study aimed to detect different genus of gastrointestinal tract (GIT) helminthes in Cattle of Baghdad province and to determine the effect of age, sex and months on the infection rates during the period extended from October 2016 to the end of May 2017. One hundred eighty eight fecal samples were examined by flotation technique for detection of gastro-intestinal helminthes, while milk samples examined by ELISA to detect the infection of ostertagiasis. The results showed that the total rate of infection of gastrointestinal Nematode (GIN) (46.80%). The highest rate of GIN was recorded in AL-Tarmya (67.34%) in December recorded the highest rate of Nematode infection was recorded, (87.5%) with significant difference (P= 0.00001). Females were recorded higher percentage of (47.20%). Fecal examination revealed the presence of parasitic eggs of *Monizia expansa* with a total infection rate of 2.65% and the highest rate of infection was in AL-Shula (4.16%). The infection with *M. expansa* parasite was reported higher in November (8.69%). Males recorded higher rate of infection (3.70%). Microscopically eggs of the family Trichostrongylidae that detected by flotation test characterized by barrel-shape and a thin wall with a mean of 77.49 x 43.12µ, while Strongyloid eggs characterized by a regular circumference and regular edges and also barrel-shape with yellowish-green color with mean size 48.67x25µ and *Monizia expansa* eggs were showed that triangle in shape containing pyriform apparatus with a mean size of 53x54.50µ. ELISA technique results, which were used to detect IgG antibodies for the Ostertagia *ostertagi* in cow's milk, recorded percentage rate of infection (38.04%). Highest rate of infection (52.17%) recorded in AL-Abayachi area. May recorded highest rate of infection (52.17%) according to months of study.

KEYWORDs: Prevalence, Gastrointestinal Helminthes, *Ostertagia ostertagi*, ELISA.

INTRODUCTION

Nutrition source depends mainly on cattle, goats and sheep that are considered an important source of animal protein for human. It was included meat and milk products, their waste product are also very important for agricultural use as manure) Nwosu *et al.*, 2007). Parasitic diseases caused by inadequate management, that cause disserves in the productive farming of these animals (Ardo and Bitrus, 2015). The Ruminants productive performance was major constrained by helminthes (Hotez *et al.*, 2004). Helminthes of gastrointestinal tract are worldwide in distribution among livestock especially ruminants known to limit cattle production in many areas and countries (Nehara, 2013). Parasitic diseases are not alarmed cause of mortality at time but their indirect effect on livestock productivity and their zoonotic impact on human health are considerably greater (Ekong *et al.*, 2012). In large part, helminthiasis is caused by Nematoda and Platyhelminthes phylums (Ekong *et al.*, 2012). Helminthes of these two phylums reach many sites of infection inside mammalian host body including intestinal lumen, intravascular lumen and intracellular sites (Littlewood and Bray, 2001). Loss of productivity of livestock industry is mainly caused by helminthes infection, that range from gastro-enteritis anorexia, abdominal distention, diarrhea, emaciation which lead to economic losses to the owners and the people in general (Junaidu and Adamu, 1997). Agro-climatic conditions were the main cause of distribution of gastrointestinal helminthes that characterized by quantity and quality of pasture, temperature, humidity and grazing behavior of the host (Pal and Qayyum, 1993). Among the gastrointestinal nematodes of cattle, the abomasal nematode *Ostertagia ostertagi* is one of the most important parasites causing impaired production in the temperate regions. *O. ostertagi* infections result in anorexia, diarrhea and weight loss (McKellar, 1993). The decrease of the production caused by bovine ostertagiosis, particularly in young animals, is the consequence of the profound pathophysiological changes occurring at the abomasal level (Fox *et al.*, 1997). In recent years, the anthelmintic resistance threat has led to an intensive interest in developing alternative control methods such as the immunological based strategy. Despite the great efforts, the development of a protective vaccine remains unfruitful (Rinaldi and Geldhof, 2012). The enzyme-linked immune sorbent assay (ELISA) is an immune assay which is used for detection of immunoglobulin as an indicator of infection. Once it has been developed for the analysis of individual serum samples, it is frequently applied to individual and bulk milk analysis. In general terms, bulk milk ELISA is an attractive option for monitoring or establishing infection status in dairy herd health management as it provides an automated, rapid and relatively inexpensive method of assessing herd-level status with regard to various pathogens including Bovine Viral Diarrhea Virus, Infectious Bovine Rhinotracheitis, *Salmonella* and parasites (Niskanen,1993).

MATERIALS & METHODS

A total number of 188 local and cross breed cattle from both sex were selected randomly and examined for gastrointestinal helminthes.

Samples collection

a. Fecal sample

Twenty five gram of fecal sample were collected from each 190 cows , of both sex (27 male and 161 female) with ages ranging (1-14) years, from some parts of Baghdad province AL-Abayachi (64), AL-Taji (51), AL-Shula (24) and Al-Tarmya (49) during the period from 20 October 2016 to 31 May 2017, with an average of two visits per a week. Fecal samples were collected directly from the rectum, in clean plastic containers and were tightly closed, recorded sequential numbers, wearing disposable gloves as a protective measure. All information, including age, sex and date of sampling was reported. Samples were transported to Parasitological laboratory/College of Veterinary Medicine/ University of Baghdad.

b. Milk sample

Ninety two samples of milk were collected directly from the udder, in a clean plastic containers and were tightly closed and it was poured to plane test tube for centrifuged for 15 minute at 2000 x g to remove lipid layer or leave milk samples until the fat layer is formed on the top of the sample, micro titer pipette under the fat layer to withdrawal the extracted 100 micro litter of skim milk and put it in the epindorfs that required for each sample, fresh ,refrigerated or previously frozen milk may be tested (SVANOVA veterinary diagnostic, Uppsala, Sweden). Samples collection from different cow's ages ranging (1-14) years during the period from January 2017 to 31 May2017, from four regions Al-Abayachi take (23) samples, Al-Taji (37) samples and Al-Tarmya (16) samples and AL-Shula (16) samples. All information, including age, month and date of sampling was reported. Samples were transported to Parasitological laboratory and internal medicine laboratory /College of Veterinary Medicine/University of Baghdad to test by ELISA.

c. Floatation method

Using saturated salt solution to identify eggs of gastrointestinal nematodes and Cestodes according to (Kuczynska and Shelton, 1999). Ocular micrometer was used to measure the dimensions of helminthes eggs and larvae (Foreyt, 2013).

d. ELISA

Immunological Test

The study's test kit was an indirect enzyme-linked immunosorbent assay (Elisa Svanovir/Sweden), which developed to detect *O. ostertagi* specific IgG- antibodies in milk samples. The kit's method is based on an indirect solid-phase ELISA, and the milk samples were exposed to the non-infectious antigens of *O. ostertagi* in the wells of the micro titer bar. The positive results were indicated by developing of a blue-green color due to conversion of substrate solution by the conjugate. The reaction was stopped by adding of stop-solution, and the results were read by using a micro plate spectrophotometer and the optical density (OD) was measured at 405 nm.

Statistical analysis:

Statistical analysis of data was performed using (SAS, 2010) (Statistical Analysis System - version 9.1). The infection rates were compared by using Chi-square test, $P < 0.05$ was considered statistically significant.

RESULTS

Floatation technique (Fecal sample):

Total rate of infection with GIN infection by using the floatation method was 46.80% with significant difference (P=0.0001).The highest rate of infection with GIN according to the month of study in December 87.5% (21/24), while the lowest recorded in October 0% (0/12) with significant variation (P=0.00001) (Table 1). Female recorded highest rate of infection 47.20% (161/188), than male 44.44% (27/188) with non-significant variation (P=0.78) (Table 2).

The total rate of infection with *Monizia expansa* (2.65%) was non significantly (P=0.58). The rate of infection with *M. expansa* according to months of study recorded November highest rate of infection with *M. expansa* 8.69% (2/23) , while the months October, December, March and May recorded 0%; (0/12), (0/24), (0/25) and (0/29) respectively with non-significant variation (P=0.51) , (Table, 3). The rate of infection according to sex was recorded the highest percentage in male recorded 3.70% (1/27), the lowest percentage present in Females recorded 2.48 % (4/161) with non-significant variation (P=0.71), (Table, 4). Total rate of infection with *Ostertagia ostertagi* by using ELISA technique recorded (38.04%; 35/92). According to month of study May recorded the highest infection rate with *O. ostertagi* 52.17% (12/23) while February recorded the lowest 21.05% (4/19) with non-significant differences (P=0.24) table (5).

TABLE 1: The rate of infection with GIN according to month of study

Months	Number of samples examined	Positive	Percentage (%)
October	12	0	0%
November	23	12	52.17%
December	24	21	87.5%
January	24	7	29.16%
February	26	8	30.76%
March	25	12	48%
April	25	15	60%
May	29	13	44.82%
Total	188	88	46.80%
P			0.00001

TABLE 2: The rate of infection with GIN according to sex

Sex	Number of samples examined	Positive	Percentage (%)
male	27	12	44.44%
female	161	76	47.20%
Total	188	88	46.80
P			0.78

TABLE 3: The rate of infection with *M. expansa* according to months of study

Months	Number of samples examined	Positive	Percentage (%)
October	12	0	0%
November	23	2	8.69 %
December	24	0	0%
January	24	1	4.16 %
February	26	1	3.84 %
March	25	0	0%
April	25	1	4%
May	29	0	0%
Total	188	5	2.65
P			0.51

TABLE 4: The rate of infection with *M. expansa* according to sex

Sex	Number of samples examined	Positive	Percentage (%)
Males	27	1	3.70%
Females	161	4	2.48%
Total	188	5	2.65%
P			0.71

TABLE 5: Infection rates of *O. ostertagi* according to the month of the study using ELISA

Month	Number of samples examined	Positive	Percentage (%)
January	16	5	31.25%
February	19	4	21.05%
March	15	5	33.33%
April	19	9	47.36%
May	23	12	52.17%
Total	92	35	38.04%
P			0.24

DISCUSSION

The present study showed that total rate of infection with gastrointestinal nematode by using floatation technique was 46.80% (88/188), this result was disagree with result recorded by (Elele *et al.,* 2014). in Nigeria who show overall prevalence was (62.1%), While the result agreed with (Chavhan *et al.,* 2008) (51.94).The differences was due to ecological variations, seasons of samples collection (Temperature and humidity), samples size and number in addition to physiological status (Ayaz *et al*., 2013) .According to months of study, the highest rate of infection with GINs recorded in December 87.5% (21/24), while lowest rate was recorded in October (zero%). This result agreed with (Altaif and Issa, 1983) noticed the high infection rate in December but disagree with (Chaudary *et al.,* 2007). In Pakistan, the highest rate was recorded in July to October. These result due the number of sample collected and meteorological factors (temperature, humidity, Rainfall) prevalence of GIN in infected cattle in outskirt of Baghdad province. The prevalence of infection depends on the availability of infective L3 on the pasture, which generally follows the trend of rainfall, with peaks in late winter, decreasing in spring to lowest levels in summer months. However, this pattern is modified by local spatial/temporal variations in weather (Roeber and Jex, 2013). Female recorded highest rate of infection 47.20% (161/188) , than male 44.44% (27/188), this result agreed with studies that show the females had highest rate than males come in line with (Patel *et al.*, 2001). (47.18%) (Bowman *et al*., 2004). While disagreed with (Gorski *et al*., 2004) (20.93%). Our result explained by females exposure to stress factor during pregnancy and parturition and lower resistance due to hormonal variation this lead to increase the number of worm (Ayaz *et al*., 2013). Rate of infection with *Monizia expansa* (2.65%) was agreed with (Ekong *et al.,* 2012), while disagreed with (Al-Dabbagh, 2016) in Iraq who recorded (28%) with *Moniezia* spp. Most of these studies attributed these variations in infection rate due to available of intermediate host (*Oribatid* mites) in the area of study (Ayaz *et al.*, 2013) in November was recorded highest rate of infection with *M. expansa* in cattle 8.69% (2/23) in comparable to other months of study (Akkari *et al.*, 2012) explained that high prevalence with cestodes infection during Autumn due to suitable condition (rainfall and low temperature) to develop orbited mites. The rate of infection was recorded according to sex the highest percentage in male recorded 3.70% (1/27), the lowest percentage in females was recorded 2.48 % (4/161), this come in agreement with (Al-Dabbagh, 2016) (33.33%) in males, while the lowest rate (26.31%) in females for *Moniezia* spp. (6.67%, 1.06%) (Roeber *et al.,* 2013).The highest rate in males may be attributed to length the period of presence males on pasture (Qamar *et al*., 2009).and practice of stall feeding females around pregnancy and less exposure to contamination pasture (Ayaz, 2013).The result of ELISA technique that used to detect *Ostertagia ostertagi* was 38.04% (35/92) which agreed with (Ramirez Remolina *et al.,* 2014). In Prince Edward Island who was recorded (29%) in pastures controlled –access grazing. While disagreed with (AL-Sary, 2017). In west province in Iraq who was recorded 13.86 % was the result of an overall seropositive prevalence of *O. ostertagi* in cattle in Spain (Pablos-Tanarro *et al.,* 2013) recorded (89.28%), Sweden by (Bennema *et al.,* 2007) who was recorded 98% *Ostertagia ostertagi* is an economically important cattle’s parasite to which acquired resistance is believed to be an immune-mediated. In comparison to other common bovine parasites, several previous studies reported the occurrence of accepted levels of immunity to other helminthes (Geldhof, 2002). ELISA technique was very accurate and might be influenced, slightly, by the storage method, length of storage, and process of milk-de-fattening, and the differences was minimal and had little effect on the interpretation of results (Vanderstichel *et al.,* 2010 and Sekiya *et al.,* 2013). Although, the significant negative impact on milk production, treatment responses to anthelmintic can vary amongst different studies and herds (Forbes *et al.,* 2018).

In conclusion the highest rate of infection (52.17%) was recorded in AL-Abayachi area. May recorded highest rate of infection (52.17%) according to months of study.

REFERENCES

Akkari, H., Gharbi, M. and Darghouth, M.A. (2012) Dynamics of infestation of tracers lambs by gastrointestinal helminthes under a traditional management system in the North of Tunisia. Parasite, 19(4):407-411.

Al-Dabbagh, S.M. (2016) Detection of gastrointestinal helminthes and Eimeria species in goat (*Capra hircus*) in some Baghdad region. Thesis of Msc. College of Veterinary Medicine, Baghdad University, Baghdad, Iraq.

AL-Sary, A.H. (2017) Immuno-detection of Ostertagia ostertagi in cattle in milk samples in West province. Education College, 28: 637-648

Altaif, K.I. and Issa. W.H. (1983) Seasonal fluctuations and hypobiosis of gastro-intestinal nematodes of Awassi lambs in Iraq. Parasitology, 86(2): 301-310.

Ardo, M.B. and Bitrus, I. (2015) Prevalence of parasitic gastrointestinal nematodes of small ruminants at Jalingo abattoir, Taraba state, Nigeria. Bayero J. of Pure and Appl. Sci., 8(2): 29-33.

Ayaz, M.M., Raza, M.A., Murtaza, S., Akhtar, S. (2013) Epidemiological survey of helminthes of goats in southern Punjab, Pakistan. Trop. Biomed., 30(1):65-71.

Bennema, S., Vercruysse, J., Claerebout, E., Schnieder, T., Strube, C., Ducheyne, E. and Charlier, J. (2009) The use of bulk-tank milk ELISAs to assess the spatial distribution of Fasciola hepatica, *Ostertagia ostertagi and Dictyocaulus viviparus* in dairy cattle in Flanders (Belgium). Vet. parasitology, 165(1-2): 51-57.

Bowman, R.E., Maclusky, N.J., Sarmiento, Y., Frankfurt, M., Gordon, M. and Luine, V.N. (2004) Sexually dimorphic effects of prenatal stress on cognition, hormonal responses, and central neurotransmitters. Endocrinology, 145(8): 3778-3787.

Chaudary, F.R., Khan, M.F. and Qayyum, M. (2007) Prevalence of Haemonchus contortus in naturally infected small ruminants grazing in the Potohar area of Pakistan. Pakistan Vet. J., 27(2): 73-77.

Chavhan, P. B., Khan, L.A., Raut, P.A., Maske, D.K., Rahman, S., Podchalwar, K.S. and Siddiqui, M.F. (2008) Prevalence of Nematode parasites of Ruminants at Nagpur. Vet. World, 1(5):140-145.

Das, S. (2010)"Fertility and parasitic infestation of Red Chittagong cattle." Bangladesh Veterinarian, 27 (2):74-81

Ekong, P.S., Juryit, R., Dika, N.M., Nguku, P. and Musenero, M. (2012) Prevalence and risk factors for zoonotic helminthes infection among humans and animals-Jos, Nigeria, 2005-2009. Pan African medical J., 12(1): 55-61.

Elele, K., Gboeloh, L.B. and Owhoeli, O. (2014) Prevalence of Gastrointestinal Helminthes in Exotic and Indigenous Goats Slaughtered in Selected Abattoirs in Port Harcourt, South-South, Nigeria. Chinese J. of Biology, 43:8-13.

Forbes, A.B., Vercruysse, J. and Charlier, J. (2008) A survey of the exposure to *Ostertagia ostertagi* in dairy cow herds in Europe through the measurement of antibodies in milk samples from the bulk tank. Vet. parasitology, 157(1-2): 100-107.

Foreyt, WJ. (2013) Veterinary Parasitology Reference Manual. John Wiley & Song, P:248.

Fox, M.T., Shivalkar, P., Carroll, A.P., Uche, U.E., Vaillant, C. and Watkinson, T. (1997) A. Effects of Ostertagia ostertagi on gastrin gene expression and gastrin- related responses in the calf. J. of physiology, 498(3): 809-816.

Geldhof, P., Claerebout, E., Knox, D., Vercauteren, I., Looszova, A. and Vercruysse, J. (2002) Vaccination of calves against *Ostertagia ostertagi* with cysteine proteinase enriched protein fractions. Parasite immunology, 24(5): 263-270.

Gorski, P., Niznikowski, R., Strzelec, E., Popielarczyk, D., Gajewska, A. and Wedrychowicz, H. (2004) Prevalence of protozoan and helminthes internal parasite infections in goat and sheep flocks in Poland. ARCHIV FUR TIERZUCHT, 47(6; SPI): 43-49.

Hotez, P.J., Brooker, S., Bethony, J. M., Bottazzi, M.E., Loukas, A., Xiao, S.H. (2004) Current Concepts: Hookworm Infection. New England J. of Medicine, 351:799–807.

Junaidu, A.U. and Adamu, S.G. (1997) Survey of Gastrointestinal helminthes parasites of dogs of public health importance in Sokoto Metropolis. In *Proceedings of the 22nd Annual Conference of the Nigerian society for Animal Production*. Abubaka Tafawa Balewa University, 4(3):59-62.

Kuczynska, E. & Shelton, D.R. (1999) Method for Detection and Enumeration of Cryptosporidium parvum Oocysts in Feces, Manures, and Soils. Appl. and environmental microbiology, 65(7): 2820-2826.

Littlewood, D.T. & Bray, R.A. (2001) Towards a phylogenetic super tree of Platyhelminthes. Inter-relationships of the Platyhelminthes, (60).23-27.

McKellar, Q.A. (1993) Interactions of Ostertagia species with their bovine and ovine hosts. International J. of parasitology, 23(4): 451-462.

Nehara, M. (2013) Survey of *Brucellosis*, *IBR* and Gastrointestinal Helminthosis in cattle (Ph.D. dissertation, Rajasthan University of Vet. and Anim. Sci. Bikaner, 334001.

Niskanen R. (1993) Relationship between the levels of antibodies to bovine viral diarrhoea virus in bulk tank milk and the prevalence of cows exposed to the virus. Vet. Record, 133(14): 341-344.

Nwosu, C.O., Madu, P.P. & Richards, W.S. (2007) Prevalence and seasonal changes in the population of gastrointestinal nematodes of small ruminants in the semi-arid zone of north-eastern Nigeria. Vet. Parasitology, 144 (1-2): 118-124.

Pablos-Tanarro A, Pérez-Cabal M Á, Ortega-Mora L M. and Ferre I. (2013) Presence of *Ostertagia ostertagi* antibodies in bulk tank milk from cattle herds in northern Spain. Vet. Parasitology, 197(1-2): 388-392.

.

Pal, R.A. and Qayyum, M.A. (1993) Distribution of gastrointestinal amphistomes and cestodes in small ruminants grazed on irrigated and non-irrigated pasture zones. In Proceeding of Pakistan Congress of Zoology, 13: 307-313.

Patel, R., Hall, L.R., Diaconu, E. and Pearlman, E. (2001) CXC chemokine receptor 2 but not CC chemokine receptor 1 expression is essential for neutrophil recruitment to the cornea in helminthic-mediated keratitis (river blindness). J. of Immunology, 166(6): 4035-4041.

Qamar, M.F., Maqbool, A., Khan, M.S., Ahmad, N. and Muneer, M.A. (2009) Epidemiology of Haemonchosis in sheep and goats under different management conditions. Vet. World, 2(11): 413-417.

Ramirez Remolina, L.X. and Villamizar Cañas, C.G. (2014) Determinación de Parásitos Gastrointestinales en tres Modelos de Producción Ovina y Bovina de la Provincia Garcia Rovira y factores de riesgo Biofísico y Socioeconómico, Asociados a su Presencia, PhD Thesis.

Raza, M.A., Iqbal, Z., Jabbar, A. and Yaseen, M. (2007) Point prevalence of gastrointestinal helminthiasis in ruminants in southern Punjab, Pakistan. J. of Helminthology, 81(3): 323-328.

Rinaldi, M., Geldhof, P. (2012) Immunologically based control strategies for ostertagiosis in cattle: Parasite Immunology, 34(5): 254-264.

Roeber, F., Jex, A.R. and Gasser, R.B. (2013) Impact of gastrointestinal parasitic nematodes of sheep, and the role of advanced molecular tools for exploring epidemiology and drug resistance-an Australian perspective. Parasites and Vectors, 6(1): 153-158.

Sangvaranond, A., Natipong, L. and Wongdachkajorn D. (2010) Prevalence of helminth parasites and intestinal parasitic protozoa among meat goats raised in private farms in Saraburi province Thailand. J. Kasetsari Vet, 20: 85-95.

Sekiya, M., Zintl, A. and Doherty, M. L. (2013) Bulk milk ELISA and the diagnosis of parasite infections in dairy herds: a review. Irish Vet. J., 66(1): 14-19.

Vanderstichel, R., Dohoo, I. and Stryhn, H. (2010) The impact of milk handling procedures on Ostertagia ostertagi antibody ELISA test results. Vet. Parasitology, 169(1-2): 204-208