PREVALENCE OF COCCIDIA AND INTESTINAL HELMINTH - PARASITES IN SHEEP IN SOME DISTRICTS –LIBYA

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ملخص الدراسة

أجريت هذه الدراسة على 250 رأس من الأغنام تم فحصها من خمس مناطق في ليبيا لتحديد معدل إصابة الأغنام بالطفيليات المعدية المعوية. بناء على نتائج هذه الدراسة، كانت الديدان الخيطية، والإميريا، والمونيزيا أكثر الطفيليات الداخلية شيوعاً حوالي 85.6٪ مصابة بالطفيليات المعدية المعوية في الخمس مناطق، وحوالي 32.8٪ من الأغنام مصابة Strongyle eggs وبلغ معدل الإصابة الإجمالي لبيض Nematodirus spp 8٪ في الخمس مناطق بينما كانت Monizia expansa13.2٪، وأظهر فحص بعد الوفاة تحديد ستة أجناس من النيماتوتا وهي: Haemonchus contortus, Trichuris globulosa, Nematodirus spp., Trichostrongylus colubriform., Trichostrongylus vitrinus, Marshallagia marshalli, and Strongyloides papillosus . وكانت نسبة الطفيليات أعلى في الأغنام التي يزيد عمرها عن عام واحد، وكان هناك تأثير معنوي بين الفئات العمرية, في حين أن الخمس المناطق كانت لديها نسبة إصابة 74.8٪ الاميريا وكانت الأنواع الرئيسية التي تم تحديدها من الاميريا هي E. aspheronica (33.7%), E.minasensis (23.5%) E. caprina (13.9%), E. christenseni (3.6%), E. hirci (6.6%), E. arloingi (14.4%).

Abstract

Study was done on total 250 sheeps were examined from five districts in Libya, to determine the rate of gastrointestinal parasites infecting sheeps. Based on the results of this study, nematodes , Emeria and Monizia expansa were the most commonly identified internal parasites of sheeps. About 85.6% of the sheeps were infected with gastrointestinal parasites in five districts About 32.8% of the sheeps were infected with Strongyle eggs, the total infection rate of Nematodirus eggs was 8% in five districts while Monizia expansa was 13.2%. The faecal examination and postmortem showed Six genera of nematode were identified such as Haemonchus contortus, Trichuris globulosa, Nematodirus spp., Trichostrongylus colubriform., Trichostrongylus vitrinus, Marshallagia marshalli, and Strongyloides papillosus. The percent parasites loads were higher in sheeps more than one year old, there was significant effect between the age classes and fecal egg loads . While the five districts had higher Eimeriainfections with 74.8%, show higher oocyst loads in five districts The main species of Eimeria identified were E. aspheronica (33.7%), and E.minasensis (23.5%) were the most prevalent species. Other species present were E. caprina (13.9%), E. christenseni (3.6%), E. hirci (6.6%), E. arloingi (14.4%).

Key words: sheeps, Gastrointestinal parasites, Libya

1-Introduction :

Sheeps play an important role in providing animal protein for the diet, especially for these people who live in the villages (Islam and Taimur, 2008**).** They become more attractive by modern and traditional industries which play a significant role in the welfare of rural families (Al-Mabruk and Alimon, 2015).

The livestock in Libya plays a crucial role in the economy, and an important socioeconomic role for small and large Libyan farms. Meat is popular among Libyan consumers, small ruminants cover about 14.5% of the total meat consumption in Libya**.** It is demand particularly high during religious and cultural festivals. The sheeps are useful for their meat, milk, wool and leather(Abubaker and Ali, 2008).

Small ruminants managed under extensive and intensive production systems are extremely susceptible to the effect of wide ranges of gastrointestinal parasites. Goats and sheep have numerous gastrointestinal parasites, many of which are shared by both species, the most important include nematodes (roundworms), cestodes (tapeworms), trematodes (flukes) and Coccidiosis, which caused by protozoa of the genus Eimeria (Zeryehun, 2012)). The susceptibility to gastrointestinal nematodes of sheep and goats are not the same. While sheep usually graze the grounds,sheeps mainly browse from bushes and trees. This adaption has brought the goats away from the higher concentrations of nematode eggs on the grazing grounds, and it is believed that this strategy has led to a lesser development of the immune system compared to sheep (Thomas et al., 2007). Gastrointestinal parasite considered one of the biggest problems in the sheep production. The infections of herds, can cause major health issues, which have a major effect on the animal's performance and cause great economic loss to the producer. In fact, most of the economic losses caused by gastrointestinal parasites are actually due to low of production (Waller, 2004b). In some herds weight loss may be reach to 6-12 kg per animal per year (Jittapalapong et al., 2012). The effect of infection by gastrointestinal parasites varies according to the parasite

concerned, degree of infection and other factors such as species, age, season and intensity of worm burden (Ahmed et al., 2011).

Helminthic and protozoal infections perhaps are the most important disease of small ruminants world-wide. Jittapalapong et. al.,(2012) found that GI parasitism among sheeps occurred all year, and the temperature between 25°C to 35°C,and humidity were the primary factors involved in the development and survival of parasitic eggs, larvae, cysts, and oocysts in the environment.

Internal parasites of sheeps cause economic losses as explained in different study, the great economic losses through reduced productivity is related to cost of treatment and control of helminthosis and their mortality rate may be reach to 30-40% (Dappawar et al. 2018). Endoparasites in Ethiopia cause yearly losses amounting to 82 million USD (Krecek and Waller, 2006), and Haemonchus contortus alone is responsible for annual loss ranging from 26 million to 45 million USD in Kenya and South Africa (Thomas et al., 2007).

The parasitic diseases are the major problem influencing the small ruminants in many parts of the world including Libya. Parasitic diseases considered one of the most serious and underestimated problems, which hinders sheeps productivity (Islam and Taimur, 2008) This study was to provide base line information of gastrointestinal parasites in this type of host.

Therefore aims of this study is planned to study the following:

2.1. Determine the rate of gastrointestinal Helminths and Eimeria infecting sheeps in five districts in Libya.

2.2. Prevalence of Helminths and Eimeria species in sheeps and determine the effect of age , gender, and various districts on the rate of internal parasite infection

2.3. Identification of Helminths and Eimeria species..

3-Materials and methods:

3.1. Animals:

1-Two hundred and fifty sheeps were examined for gastrointestinal parasites from five districts in Libya (Souq alkhames (A), Wadi alrabai (B), Zauia (C), Tarhuna (D), Al-zahra (E) by parasitological method(Hansen and Perry, 1994, Gaherwal et al., 2016)

2- fifty sheeps were post mortem examined for gastrointestinal nematodes and tap worms, the animals were selected from difference slaughter places to examine of abomasum, small intestine and large intestine were collected from each animals.

3.2.Fecal examination:

3.2.1. Collection of fecal samples:

Fecal sample were collected from the rectum of the animal the age and gender was recorded, if rectal sample cannot obtained the fresh fecal sample may be collected from the pasture, each sample was collected in clean plastic bag and deliver directly to the laboratory for examination.

3.2.2.Examine of sample

3.2.2.1. Qualitative method (Fecal examination):

A- Parasite eggs separated (Flotation method) (Willis technique):

Fecal samples are examine for the presence of diagnostic parasitic stages by floatation technique (Hussein et al., 2017)

3.2.2.2. Quantitative method:

A- McMaster counting technique:

McMaster egg counting method was used to determine the number of eggs per gram(e.p.g.) of feces in the positive fecal samples and the degree of severity was categorized based on previously described methods by (Agneessens et al., 2000). A Hawksley connoting chamber (Hawksley, England) was used..

3.2.2.3.Fecal culture:

In general, the eggs of many species of gastrointestinal nematodes are difficult to distinguish by their morphology and size(Koons et al., 1974),for these parasites differentiation can be achieved by the use of fecal cultures, that provide an environment suitable for the hatching of helminth eggs and development to the infective larval stage according to (Van Wyk et al., 2004).

B. Identification of Eimeria:

Oocyst were separated from fecal sample by flotation with salt solution the Eimeria have been classified based on morphology and recognized by their typical oocyst size (Smith and Sherman, 2011).

3.3. post mortem examination :

The intestinal content was examined microscopically for nematodes and tap worms, and identified according their morphology, identified as per the technique of (Gibbs and Gupta, 1972).

3.4. Data Analysis:

Data was analyzed to calculating percentage of gastrointestinal parasites and recorded in Microsoft exal spread sheet and analyzed by spss version 20, to identified the presence of association between factors and parasitic infection were compared using chi-square test and correlation analysis the level of significance was set at <0.05.

4-Result:

4.1-Faecal examination:

Table 1- Prevalence of parasitic infection in different districts:

Districts	Examined animals	Infected animals		Eimeria oocyst		Strongyles eggs		Nematodirus eggs		Marshallagia marshalli eggs		Strongyloides papillosus eggs		Monizia expansa eggs	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
A	50	42	84	42	84	7	14	3	6	2	4	4	8	8	16
B	50	45	90	40	80	17	34	6	12	-	-	12	24	-	-
C	50	47	94	26	52	33	66	-	-	-	-	-	-	3	6
D	50	34	68	33	66	4	8	3	6	-	-	4	8	6	12
E	50	46	92	46	92	21	42	8	16	1	2	5	10	16	32
Total	250	214	85.6	187	74.8	82	32.8	20	8	3	1.2	25	10	33	13..2

(Table 1) and (figure 1) show that, out of the 250 sheeps fecal samples were examined in the present Work, 214 sheeps were parasitic positive (85.6%). Eimeria infections were the most rate parasitic infection (74.8%), with higher percentage in Zawiya and Al zahra, 94% and 92% respectively, nematodes eggs were detected in examined sheeps listed in(tables 1) include Strongyle eggs 32.8%, Nematodirus eggs 8%, Marshallagia marshalli eggs 1.2%, Strongyloides papillosus eggs 10%(figure 1), while the percentages of Monizia expansa eggs in

the present work was 13.2%, it was higher in Al-zahara with percentage was (32%), and it was not found in Wadi al rabai .

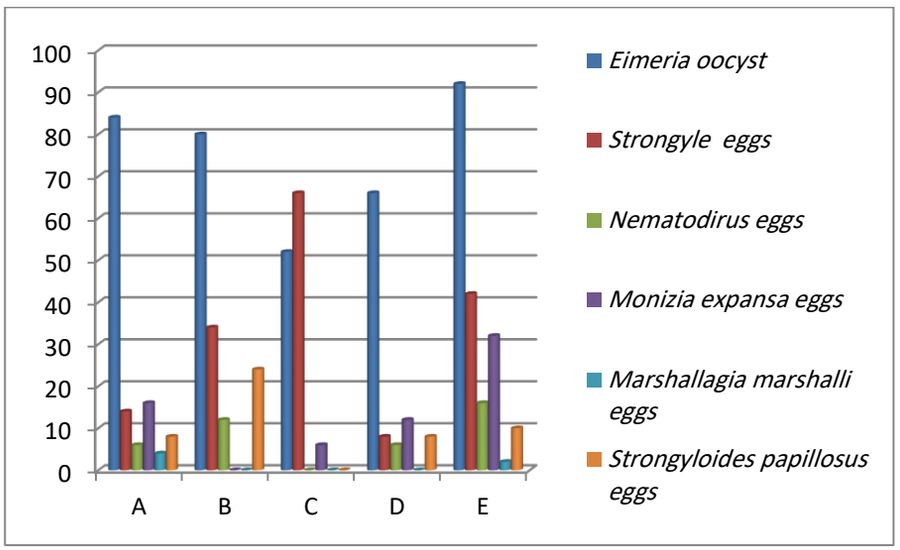

Figure 1-Prevalence of infected sheeps in five districts.

Table 2-Prevalence of gastrointestinal nematode species in five districts

Parasite species	A %	B %	C %	D %	E %
Haemonchus contortus	-	-	62	9	28
Trichostrongylus colubriformis	4	8	24	10.5	9
Trichostrongylus vitrinus	2	-	-	-	-
Nematodirus spp	6	12	-	6	16
Marshallagia marshalli	4	-	-	-	2
Strongyloides papillosus.	8	24	-	8	10

The species diversity of various nematode found in sheeps in different districts is shown in(figure2). It was observed different species of nematode parasites, Upon fecal culture of those fecal samples it was found positive for six species of nematode parasites which recognized and listed in(tables 2) as, Haemonchus contortus Trichostrongylus colubriforms, Trichostrongylus vitrinus, Nematodirus spp, Marshallagia marshalli and Strongyloides papillosus .

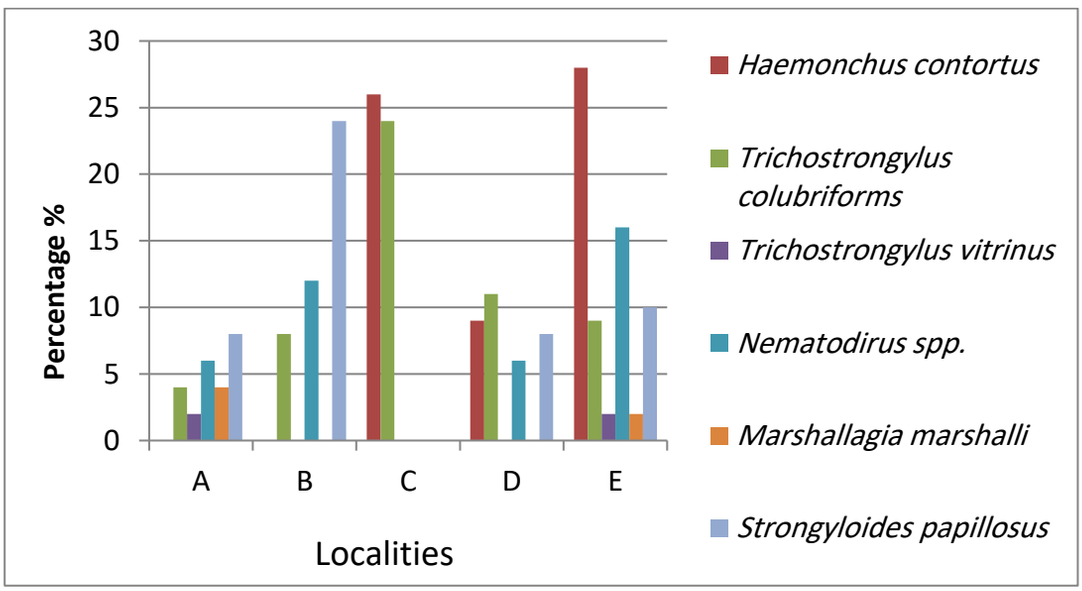

Figure 2-Distribution of G.I. nematode larvae in five districts

Table 3\Rate of gastrointestinal parasites of sheeps according to age:

Animals	Examine Animals	Infected Animals	%	Correlation	P value
Less than one year	142	116	81.6	0.187	0.000
More than one year	108	98	90.7	0.893	0.000

Total	250	214	85.6	1	0.000

Table4-Rate of gastrointestinal parasites of sheeps according to gender:

Animals	Examine Animals	Infected Animals	%	Correlation	P value
Male	129	114	82.6	0.083-	**0.299**
Female	121	100	88.3	0.255	**0.000**
Total	250	214	85.6	1	**0.469**

Statistical analysis indicated that there was a significant difference in the overall rate of infection between the age categories ($p < 0.05$). As shown in (Table 3) the highest was in sheep >1 year old age group (90.7%), and the lowest in <1 year old age group (81.6%), by fecal examinations, respectively. On the other side, although higher rate was observed in more than one year old compared to less than one year old that means there was significant effect between the age classes (Table3).

The results of the correlation analysis between age and gastrointestinal parasite infection are presented in the (Table 3). that reported positive correlation between rate of infection and animals that more than one year old. with a correlation of (r=0.893,) This relationship is statistically significant with value of ($P<0.05$)

The rate of most detected infection observed in the present work was higher in female sheep than male sheep, where the infection rate was 88.3% in female and 82.3% in male (Table 4). Although there was a weak positive correlation between rate infection and female sheep. Moreover Statistical analysis indicated that there was a non-significant effect in the occurrence of internal parasite infection and gender ($p = 0.469$, $r = 0.255$).

Table 5- Incidence of nematodes on the basis of eggs collection in different districts:

Parasite species	No. of host infected	Average of eggs collected	Incidence infected%	Intensity of infection	Density of infection
A	10	42.85	20%	428.5	85.7
B	23	145.45	46%	632.39	290.9
C	33	298	66%	903	596
D	7	370	14%	5285.7	740
E	29	260.4	58%	898	520.8
Average	102	1116.7	40.8%	1094.8	446.6

The overall infection on the basis of egg collection showed that in (D) locality have the highest mean intensity was 5285.7 as shown in Table 5, while mean intensity of infection was moderate in districts (C), and (E), the results showed that Intensity of infection in other districts were lightly infected. while reported low mean of density of infection in all districts In generally there was the intensity average of the infection was moderate in the present study (table 5).

Table 6 –Showing severity of infection of G.I.N. in different districts:

Animal districts	Light infection (300-800e.p.g)	Moderate infection (800-7000e.p.g)	Heavy infection (+7000e.p.g)
A	100%	-	-
B	100%	-	-
C	94%	6%	-
D	100%	-	-
E	66%	44%	-

The fecal samples positive for GIT nematode were subjected to McMaster egg counting chamber for EPG count to determine the severity of parasitic

infection. An effort was made to compare the degree of severity in the different districts, there was the severity of the infection was generally light in the present study (table 6). it was also found that 94% light infection with 6% medium infection in locality (C), and 66% light infection with 44% medium infection in locality (E) .

Table 7-Prevalence of Eimeria species in different districts:

Number examined animals	Number infected animals	Eimeria species	Number of infected animals	Percentage
166	**105 (63.2%)**	E.aspheronica	**56**	**33.7%**
		E.arlongi	**24**	**14.4%**
		E.caprina	**23**	**13.9%**
		E.hirci	**11**	**6.6%**
		E.minasensis	**39**	**23.5%**
		E.christenseni	**6**	**3.6%**

(Table 7) summarises six species of the genus Eimeria were described from the fecal sample, in the area of study and the main species of Eimeria identified were E.aspheronica, E.arlongi E.caprina, E.hirci, E.minasensis, E.christenesis, and thier percentage was 33%, 14.4%, 13.9%, 6.6%, 23.5%, 3.6%, respectively. The identification of Eimeria species revealed the predominance of high percentage which was Eimeria aspheronica (33.7%)

4.2.Post mortem examination:

Gastrointestinal tracts of 50 sheeps were examined. Adult nematodes were found in 5 (12%) of these specimens (table 8). The parasite involved were Haemonchus contortus 6 % , Trichuris globulosa 4% and monizia expansa 2%.

Table 8- Gastrointestinal nematode of the sheep in different districts:

Examined animals	Infected animals	Parasites		
		Haemonchus contortus	Trichuris globulosa	Monizia expansa
50	6	3	2	1
Percentage	12%	6%	4%	2%

5-Discussion:

Based on the results of this study, the examination of fecal samples revealed an overall gastrointestinal parasites infection of 85.6%,(the mixed infections, however, were found in most of the samples) this percentage agrees with the result of Kelemework (2016) who reported 86.2% in sheeps, Jittapalapong (2012) detected it in 86% of sheeps at Thailand, Islam (2008) reported 75% gastrointestinal parasites infection of sheeps at Bangladesh, and the current finding, were comparable with the studies reported by Thomas (2007)88% in Eastern Ethiopia, and Agbajelola (2015) which could be as a result with rate infection was 82% in Nigeria. In Egypt Dappawar et al. (2018) detected it in 91.7%.

Ratanapob et al. (2012) found out that several risk factors such as animal husbandry practices and weather conditions play roles in the severity of GIP infections. other study also noted the importance of warm temperature, optimum moisture and poor hygiene as important factors to GIP infections(Relf et al., 2011). Velusamy et al. (2015) and Pathak and Pal (2008) found that parasitic infection is high in rainy seasons and low in winter season**.** The difference in the internal parasites in the present study compared with the previous studies in

different countries could be due to existence of different climatic or environmental factors that could support survival and development of infective larval stage of most parasites.

The gastrointestinal nematodes had high ratio infection they were detected in 36% of examined sheeps, The predominant nematodes in examined fecal samples were Trichostrongylus colubriforms.,Trichostrongylus vitrinus. Haemnchus contortus, Nematodirus spp., Marshallagia mashalli,and strongyloides spp., the most commonly detected species on different districts was Trichostrongylus spp. which was present on four districts in this study, this finding is supported by a previous study by(Burgess et al., 2012) which found Trichostrongylus spp. on all farmers surveyed in England, and there are a number of possible reasons why Trichostrongylus is so successful, this include of free living stage to develop in the low temperature and increasing reports of Trichostrongylus population showing resistance to multiple anthelmintes. Cestode infection represented as eggs of Moniezia expansa which was detected in the current study with ratio of 12.4% in five districts This finding was consistent with other report of (Rahman et al., 2011).

In many studies it was found that the gastrointestinal parasites of sheep are very similar to those in goats (goats and sheep share the same parasites) (Gadahi et al., 2009). This was in common with the results of El Naas et al. (202003) in Libya, in this study we observed the same species of gastrointestinal parasites in sheep with gastrointestinal parasites in goats. This is assumed to be due to that they were being grazed together on the majority of the farms.

The present study showed that the internal parasites were significantly ($p<0.05$) higher in sheep more than one year old compared to goat less than one

year old. This might be due to older goats grazing habits in low land and grass of low land contains more eggs of helminth(Rahman and Islam, 2014). However, there was no significant ($p>0.05$) difference in the prevalence of internal parasites between male and female The differences observed in the prevalence of aforementioned are partly related to the variance in the management practices.

This finding was in agreement with other study indicated that animals more than one year had a higher infection of gastrointestinal parasites compared with animals less than one year age. This result suggested that adult sheep could be an important factor in distributing infections among herd. The possible reasons for these differences observed in the prevalence of the gastrointestinal helminthes parasites recorded in this study and that recorded by previous researchers may be because of the most of the animals harbored concurrent of infection (Zeryehun, 2012).

During the study, the percentage of the gastrointestinal parasites of sheeps have indicated that female sheep were slightly more infected than the male Moreover Statistical analysis indicated that there was a non-significant effect in the occurrence of internal parasite infection and gender However, this variation in susceptibility was statistically not significant ($P>0.05$.

The rate of Eimeria distributed worldwide was high according to many studies, the rate at any time can be as 38% -100% Smith, (2011). Most sheeps examined in this study harbored Eimeria infection, the rate of Eimeria parasite in five districs was 70.4%.

(2018) mentioned that Eimeria oocysts are widely present in feces of both normal and diseased small ruminants with reported range of 88% of all sheeps. They attributed the high incidence of Eimeria to the quite resistance of their

oocysts to the environmental factors and exposure of animals to poor hygienic conditions. During the examination of the fecal sample six species of Eimeria were found namely E.apsheronica, E. Caprina, E. Minasensis, E. Christenseni, E.hirci, E.arlongi,. This finding was consistent with other described by Faizal (2001).these include E. arlongi, E.hirci, E.Christenseni, E.alijevi, E.apsheronica, E.jolchijevi, E.ninakohlykimovae,

During the study period, the rate based on mean Quantitative method of the gastrointestinal nematode by McMaster egg count was conducted, and the result showed light infection by all the genera of nematode that were encountered in sheeps. But there was moderate in two district and no heavy infection observed based on mean Quantitative method by any gastrointestinal nematode in the study period. The classification of intensity of parasitic infection was made based on fecal egg counts as light (50 to 800), moderate (801 to 1200) and heavy (>1200) as described for mixed infection in grazing small ruminants.

Post-mortem examination of sheeps revealed the rate of infections of 5%, species of helminthes were detected in examined sheeps were Haemonchus contortus (6%), Trichuris globulsa(4%) and Monizia expansa was 2%, most studies indicate Haemonchus contortus as the most prevalent parasite infections in small ruminants, and associated with problems in their control and of anthelmintic resistance relate specifically to Haemonchus contortus, which considered the most pathogenic parasite of small ruminants (Waller, 2004b).

6. Recommendations and future research:

In order to have an integrated control programme for parasites of sheeps, it is recommended that:

-Treatment program must be done as early as possible and concern whole group of animal.

-Anthelmintics should be used quarterly in a year (to reduce risk of infection even in all seasons).

-Control measures for coccidia should be use of anticoccidial drug.

-Continuity research on the parasite ecology and species composition identification is recommended to be done to give a clear picture on the pattern of gastrointestinal parasite infections.

-Well training of veterinarians needed especially for prevention and control measures against gastrointestinal parasites.

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