

Detection of gastrointestinal parasite infection of sheep and goats in Diyala Province-Iraq

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Abstract

This study has been conducted to determine the prevalence of gastrointestinal parasite infection in sheep and goat in 4 districts of Diyala province in Iraq. From December 2012 to June 2013, a total of 220 fecal samples were collected (143 from sheep and 77 from goats). Of the total samples examined, 187 (85.0%) were found positive for gastrointestinal parasites. Prevalence of gastrointestinal parasite infection were higher (86.71%) in sheep when compared to goats (81.81%). Young age group showed higher ($P < 0.05$) prevalence of infection when compared to adults in both sheep and goats. Parasites identified in this study in both species included: Protozoa, *Eimeria spp.* (86.09%); Nematode, *Strongyle type of eggs* (72.72%), *Strongyloides spp.* (67.37%) and Cestodes, *Monezia spp.* (59.89%). Eight *Eimeria* species were identified; *E. ahsat* (25.62%), *E. crandallis* (21.87%), *E. granulosa* (16.15%), *E. parva* (14.37%), *E. intricate* (13.75%), *E. pallida* (9.94%), *E. oviniodalis* (6.21%) and *E. faurei* (3.73%).

Key words: Gastrointestinal parasites, *Strongyloides*, *Monezia*, *Eimeria*, *Strongyle*, Sheep, Goat.

الكشف عن الإصابة بطفيليات القناة المعوية في الأغنام والماعز في محافظة ديالى - العراق

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الخلاصة

اجريت الدراسة الحالية لمعرفة مدى انتشار الإصابة بالطفيليات المعوية المعديّة في أغنام وماعز اربعة اقصية من محافظة ديالى ، العراق. ابتداء من شهر تشرين الثاني 2012 ولغاية شهر حزيران 2013. بلغت عدد العينات الكلية 220 عينة براز يواقع (143 عينة براز من الاغنام و77 عينة براز من الماعز). 187 عينة براز من العدد الكلي كانت مصابة بالطفيليات المعوية المعديّة بنسبة (85%) . ان نسبة انتشار الإصابة بالطفيليات المعوية المعديّة كانت اعلى بالأغنام (86.71%) مقارنة بالماعز (81.81%). بينت الدراسة بان نسبة انتشار الإصابة بالديدان المعوية المعديّة في المجاميع العمرية الفتية في كلا النوعين كانت اعلى مقارنة بالمجاميع العمرية البالغة وباختلاف معنوي. تضمنت الدراسة الحالية تشخيص طفيليات في كلا النوعين ونسبة اصابة بلغت الأوالي الأكريات (86,09%) ، الديدان المستديرة، (72,72%) ، الأسطوانيات (67,37%) والشريطيات ، المونيزيا (59,89%) . شخصت ثمانية انواع من الاكريات وكالاتي، *E. ahsat* (25.62%)، *E. crandallis* (21.87%)، *E. granulosa* (16.15%)، *E. parva* (14.37%)، *E. intricate* (13.75%)، *E. pallida* (9.94%)، *E. oviniodalis* (6.21%)، *E. faurei* (3.73%).

الكلمات المفتاحية : الطفيليات المعوية المعديّة ، الاغنام ، الماعز .

Introduction

The gastrointestinal tract (GIT) of animals harbor a variety of parasites particularly helminthes, which causes clinical and sub clinical parasitism. These parasites diversity affect the health status of animals and cause enormous economic losses to the livestock industry. It is constitutes to pose a serious

health threat and a limitation to the productivity of small ruminants due to the associated morbidity, mortality, cost of treatment and control measures (1). Nematode parasites of small ruminants result in low productivity due to stunted growth, poor weight gain and poor feed utilization

(2). Clinical coccidiosis of small ruminant occurs mainly in young ages and has a higher prevalence under conditions of intensive husbandry (3). The disease may occur under stress factors such as weaning, dietary changes, inclement weather, or travel and regrouping (4). The prevalence of gastrointestinal helminthes is related to the agro climatic conditions like quantity and quality of pasture, temperature, humidity and grazing behavior of the host (5). However, in most areas of Diyala studies concerning prevalence of gastrointestinal parasites (GIP) in small ruminants are rare. Therefore, the current study aimed at investigating the prevalence of GIP infection in sheep and goats raised in these areas.

Materials and methods

Animals: A total of 220 fecal samples (143 from sheep and 77 from goats) were collected randomly (some of smaller age animals passing yellowish diarrhea) from animals raised in various farms and small stock holders in four cities of Diyala provinces; 25 from Baqubah (19 sheep and 6 goat), 155 from Baladruse (95 sheep and 60 goat), 20 from Al Mugdadia (14 sheep and 6 goat) and 20 from Al Kalis (15 sheep and 5 goat). Animals included in the study were subjected to general clinical examination.

Samples: Fecal samples were directly collected from the rectum of each sheep and goats, put in screw-cupped plastic containers and transported to the clinical pathology laboratory at the Faculty of Veterinary Medicine in Diyala University.

Laboratory examination: Fecal samples were subjected to macroscopical; color, consistency of feces (diarrhea, softy and semi-solid feces), and microscopical examination. Detection and identification of parasite eggs and oocysts were carried by applying direct microscopic examination, centrifugation floatation with saturated (NaCl) solution and sedimentation according to techniques and morphological characteristics suggested by (6,7 and 8).

Statistical analysis:

The data were analyzed statistically using the Chi-Square test (SPSS for windows, Version 12).

Results

During period of the study, the overall prevalence of gastrointestinal parasites in sheep and goat was 85% (187 of 220). The prevalence of infection was higher in sheep (86.71%) when compared to goats (81.81%) ($P>0.05$). Eggs and oocysts of (GIP) identified in this study in both species are shown in (Table 1). It included: Protozoa, *Eimeria spp.* (86.09%); Nematode, *Strongyle type of eggs* (72.72%), *Strongyloides spp.* (67.37%) and Cestodes, *Monezia spp.* (59.89%). According to months of year, the present study recorded high prevalence of gastrointestinal parasite infection in both species in February (93.75%) and January (93.1%) and lower infection in June (75%), (Table 2). On the other hand it showed higher percentage of *Strongyle* type of eggs infection in June; 88.23% and 81.81% and lower percentage in February; 63.15% and 58.33% in sheep and goat respectively. In addition to that, the prevalence of infection with parasites passing *Strongyle* type of eggs tend to be higher in sheep (75%) than goats (68.25%) (Table 2). Prevalence of *Eimeria spp.* infection in goat was higher (87.30%) than sheep (85.48%), (Table 2). For coccidial infection in sheep, highest percentage of infection has been reported in February (94.73%) and the lowest (70.58%) in June. For goats prevalence of infection was (100%) in February and the lowest (72.72%) in June. (Table 2). Analysis of the data on the basis of sex revealed to male of both species higher than female without significant difference ($P>0.05$) in the overall prevalence of gastrointestinal parasites in male (88.23%) and female (85.33%) sheep and male (82.75%) and female (81.25%) goats (Table 3). Maximum parasite infection was observed in age group (1-6 month); (91.66%) (92.10%) and in age group (>6-12 month); (89.13%), (81.81%) compared to adults (1-4 years); (75.67%), (58.82%) of sheep and goat respectively ($P<0.05$) (Table 4). The results showed variable percentage of infection with no significant difference ($P>0.05$) in the prevalence of gastrointestinal parasite of sheep and goat among different regions of Diyala province (Table 5).

Table (1) Identified of gastrointestinal parasite species in sheep and goat.

Gastrointestinal parasite species	Sheep						Goat					
	Male			Female			Male			Female		
	N.E	N.I	N.P. (%)	N.E	N.I	N.P. (%)	N.E	N.I	N.P. (%)	N.E	N.I	N.P. (%)
(Nematode)												
<i>Strongyles type of egg spp.</i>	68	60	47 (78.33)	75	64	46 (71.87)	29	24	18 (75.0)	48	39	25 (64.10)
<i>Strongyloides papillosus</i>	68	60	42 (70.0)	75	64	44 (68.75)	29	24	16 (66.66)	48	39	24 (61.54)
(Cestodes)												
<i>Moneizia benideni</i>	68	60	28 (46.66)	75	64	26 (40.62)	29	24	11 (45.83)	48	39	18 (46.15)
<i>Moneizia expansa</i>	68	60	12 (20.0)	75	64	16 (25.0)	29	24	7 (29.16)	48	39	10 (25.64)
(Protozoan)												
<i>Eimeria spp.</i>	68	60	52 (86.66)	75	64	54 (84.37)	29	24	21 (87.5)	48	39	34 (87.18)

N.E = Number examined, N.I = Number infected, N.P. = Number positive, (%) = Percentage

Table (2) Relation of gastrointestinal parasite infection with month of years.

Month	Sheep					Goat					
	N.E	N.I	Total	G.I.P (%)	S.T.E (%)	N.E	N.I	Total	G.I.P (%)	S.T.E (%)	E. (%)
December	8	7	(87.5)	(57.14)	(71.42)	7	6	(85.71)	(66.66)	(83.33)	
January	15	14	(93.33)	(64.82)	(92.85)	14	13	(92.85)	(61.53)	(92.3)	
February	20	19	(95.0)	(63.15)	(94.93)	12	12	(100.0)	(58.33)	(100.0)	
March	23	21	(91.30)	(71.42)	(90.45)	11	10	(90.90)	(70.0)	(90.0)	
April	25	22	(88.0)	(77.27)	(83.36)	9	7	(77.77)	(71.42)	(85.71)	
May	30	24	(80.0)	(84.0)	(80.0)	6	4	(66.66)	(75.0)	(75.0)	
June	22	17	(77.27)	(88.23)	(70.58)	18	11	(61.11)	(81.81)	(72.72)	
Total	143	124	86.71			77	63	81.81			

$X^2 = 77.098$, $P < 0.05$, S.D. $X^2 = 31.182$, $P < 0.05$, S.D.
Total $X^2 = 6.022$, $P < 0.05$, S.D.

N.E = Number examined, N.I = Number infected, S.T.E = *Strongyle type of egg*, E. = *Eimeria spp.* (%)

Table (3) Relation of gastrointestinal parasite infection with sex of animals.

Sex	Sheep			Goat		
	Number examined	Number infected	(%)	Number examined	Number infected	(%)
Male	68	60	88.23	29	24	82.75
Female	75	64	85.33	48	39	81.25
Total	143	124	86.71	77	63	81.81

$X^2 = 0.261$, $P > 0.05$, N.S.D. $X^2 = 0.028$, $P > 0.05$, N.S.D.
Total $X^2 = 6.022$, $P < 0.05$, S.D.

Table (4). Relation of gastrointestinal parasite infection with age of animals.

Age	Sheep			Goat		
	Number examined	Number infected	(%)	Number examined	Number infected	(%)
1-6 Month	60	55	91.66	38	35	92.10
>6- 12 Month	46	41	89.13	22	18	81.81
1-4 Years	37	28	75.67	17	10	58.83
Total	143	124	86.71	77	63	81.81

$X^2 = 5.423$, $P > 0.05$, N.S.D. $X^2 = 8.746$, $P < 0.05$, S.D.
Total $X^2 = 6.022$, $P < 0.05$, S.D.

X^2 =Chi-Square, P=Probability value, S.D.=Significant differences, N.S.D.=No Significant differences

Table (5). Relation of gastrointestinal parasite infection with area of study.

Region	Sheep			Goat		
	Number examined	Number infected	(%)	Number examined	Number infected	(%)
Baqubah	19	15	78.94	6	4	66.66
Baladruze	95	85	89.47	60	51	85.0
Al Muqdadia	14	11	78.57	6	4	66.66
Al Kalis	15	13	86.66	5	4	80.0
Total	143	124	86.71	77	63	81.81

$X^2 = 2.428$, $P > 0.05$, N.S.D. $X^2 = 2.271$, $P > 0.05$, N.S.D.

A total of 8 Species of *Eimeria* were identified based on morphological characteristics of oocysts. Out of 187 samples infected by gastrointestinal parasites 160 (85.56%) were positive to *Eimeria spp.* The common *Eimeria* species found in sheep

are *E. ahsat* (22.64%), *E. crandallis* (18.86%), *E. granulosa* (16.03%), *E. parva* (13.20%), *E. pallida* (10.37%), *E. intricate* (8.49%), *E. oviniodalis*, (6.60%) and *E. faurei* (3.77%) and in goats were *E. ahsat* (31.48%), *E. crandallis* (27.77%), *E. intricate* (24.07%) and *E. parva* (16.66%). Most of the animals showed mixed infection with more than one type of parasites (Fig. 1); (86.09%) of sheep and goat were infected with more than one type of parasite and

(13.90%) of both species were infected with one type of parasites. Animals infected with coccidiosis exhibited clinical signs as diarrhea, yellowish color in smaller age and passing soft to semi-solid feces in adult age, in addition to emaciation and loss of appetite. Increase in respiratory and heart rate, paleness of mucosa, weakness, and dehydration were exhibited in most sheep and goats infected by parasites passing *Strongyle type of eggs*.

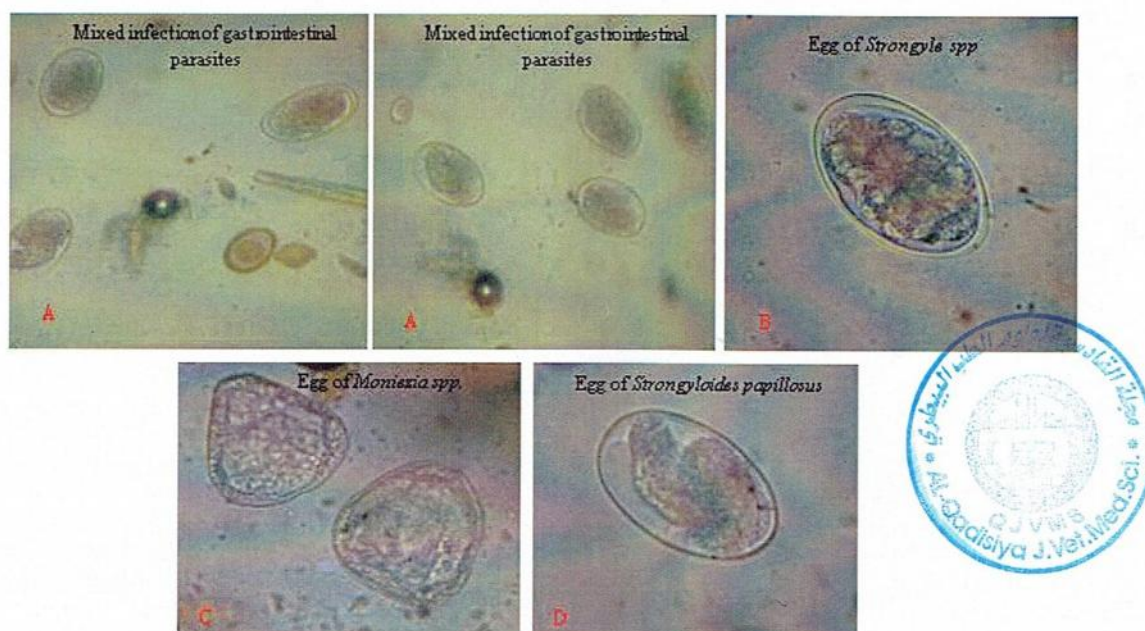


Fig. (1) Direct smear of fecal samples of animals show ; A-Mixed infection of gastrointestinal parasites (eggs of *Strongyle spp.*; eggs of *Strongyloide spaillosus*; oocyst of *Eimeria spp.*), B-Egg of *Strongyle spp.*, C-Egg of *Moniezia spp.*, D-Egg of *Strongyloides papillosus*.

Discussion

The overall higher prevalence of gastrointestinal parasite infection in the areas included in this study could be attributed to lower immunity of hosts as a result of malnutrition, grazing of young and adult animals together in poorly drained land provide an ideal condition for the transmission of the eggs of endoparasites to build up clinical infestation of the host; this finding is in agreement with many researchers (9,10). Species of parasites recovered in the present study was also reported in some Asian countries (9,11). The higher prevalence of parasites passing

Strongyle type of eggs in sheep than goats may be attributed to a variety of factors like ground grazing habit of sheep, relatively less cleanliness and extensive pasture grazing compared with goats (8,13). Higher prevalence of coccidiosis in goat than sheep can be attributed to the fact that goats acquired a lower level of immunity to gastrointestinal parasites, Coccidiosis compared to sheep, which develop a strong natural immunity around 12 months of age (12), this result is agreement with that reported by (14). The high percentage of sheep and goats infected with *Strongyle type*

of eggs in June and May maybe related to the climatic factors like temperature and humidity are favorable for the development and survival of pre-parasitic stages of nematodes, this finding in close agreement to that of (10,15). On the other hand the high percentage of sheep and goat infected with *Coccidia spp.* during February and January may be explained by increase in the rains, humidity and decrease in temperature, all are favorable for the development of coccidial oocysts (16). Younger animals showed higher prevalence of infection than adults, this is mostly attributed to immunity or it can be related to crowding stress and managements practice in the farm where the first a lot of sheep and goats were moved into the infected farm without any suitable strategy against the infection this result had already reported by various researchers in different parts of the world (11,14,16,17). While the low prevalence of gastrointestinal parasites infection in adult can attributed to acquired immunity and resistant subsequent to previous exposure (16,18). However the male show high prevalence infection with no significant difference compared with female of sheep and goats this finding agreed with (11) and (14) and disagreed with result of (16). The high percentage of gastrointestinal parasites infection in Baldruze an Alkalis may be attributed to open grazing in pasture (open house animals) and low percentage due to the animals were grazing in (closed house) in Baqhuba and Mugdadia. Species of *Eimeria* recognized in Diyala province are

similar to those reported by others (16,19, 20,21). Difference in the prevalence of parasite infestation among different cities included in this study is due to difference in the ecology of these cities. Presence of mixed infection with gastrointestinal parasite recorded in this study has been reported previously in these animal species (10, 11). The clinical signs of coccidiosis exhibited in animals of this study agreed with those mentioned by (16) and (21). Whereas the clinical signs in animals infected with gastrointestinal parasites passing *strongly type of eggs* agreed also with result of (9) and (11).

Conclusions

The area of study is endemic with gastrointestinal parasites infection, the gastrointestinal parasites infection present among of the months of year, and difficulties were encountered in differentiating parasite genera passing *strongyle type of eggs* as *Haemonchus*, *Chabertia*, *Cooperia*, *Trichostrongylus*, and *Ostertagia*. Since the specific diagnosis cannot be made through egg morphology, it may be necessary to cultivate the eggs to produce the 3rd. Stage larvae that is sufficiently different and make it possible to distinguish between different genera.

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