



Tikrit Journal of Pure Science

ISSN: 1813 – 1662 (Print) --- E-ISSN: 2415 – 1726 (Online)

Journal Homepage: <http://tjps.tu.edu.iq/index.php/j>



diagnosis of protozoa and nematodes in stomach and intestine of sheep in Salah Al- Din Governorate

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<https://doi.org/10.25130/tjps.v25i6.305>

ARTICLE INFO.

Article history:

-Received: 30 / 7 / 2020

-Accepted: 17 / 9 / 2020

-Available online: / / 2020

Keywords: Intestinal protozoa, Nematodes, Diagnosis, Sheep

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ABSTRACT

This study was designed to diagnose intestinal protozoans and Nematodes in sheep in Salah al-Din Governorate, As 500 sheep fecal samples were collected from different regions of Salah Al-Din Governorate for the period from November 2019 to April 2020, The result of the study showed that the total number of positive samples for infection with intestinal protozoa and Nematodes is 270 samples with an infection rate of (54%), and The results also showed that the total infection rate of intestinal protozoa was (24%), Nine species of *Eimeria* were diagnosed in sheep, and the highest infection rate for *E. parva* (14.4%) and the lowest rate for *E. weybridgeensis* (2.2%), While *Cryptosporidium* Spp the infection rate was (1.8%). As for overall infection of nematodes was (42%) The highest rate of infection *Marshallagia marshalli* was (44.4%) and the lowest rate of infection with *Strongyloides papillosus* was (2.9%). The diagnosis of oocysts and eggs depended on the morphological features and measurements that existing in specialized reference.

Introduction

Sheep infected with many types of parasites that inhabit the stomach and intestine and cause a major losses in productivity and health problem. Sheep infected with coccidiosis caused by two types of intestinal protozoans (*Eimeria* and *Cryptosporidium*) which are obligate and intracellular parasite[1].

Sheep are susceptible to infected by *Eimeria* of all ages and breeds, the major clinical signs with *Eimeria* is characterized by diarrhea which can be hemorrhagic and poor weight and weakness in adult sheep.[2].

As for *Cryptosporidium*, it is a zoonotic disease between human and animals, which is characterized as being the second cause after the rotavirus, causing economic losses around the world[3]. and Decreased immunity in an infected animals.[4].

As for Nematodes, they are considered intestinal parasites that infect sheep, causing economic losses[5], as sheep are affected by infection with these worms at a high rate leading to the emergence of major pathological changes such as protein deficiency, anemia in the body, lack of appetite, ease of wool removal and lack of Meat and milk production, as well as changes in the inner wall of the intestine and changes in the vitality and shape of

microvilli and epithelial cells of the intestine leading to an imbalance in the process of nutrient absorption[6]. This study was aimed to diagnose intestinal protozoa and Nematodes in sheep in Salah al-Din Governorate.

Materials and methods

Since November 2019 to the end of April 2020, 500 feces samples were collected directly from sheep from different regions of Salah al-Din Governorate, Each sample was kept in dry and clean container labeled with the sheep number, date and place of taking the sample Then, feces samples were examined using Modified Zeihl-Neelson to diagnose infection with the *Cryptosporidium* spp.[7]. Flotation method by using saturated sugar solution to diagnose *Eimeria* oocyst cysts and Nematode eggs.[8].

Results:

The results of the study showed that 270 (54%) of sheep were infected with protozoa (*Eimeria* and *Cryptosporidium*) and Nematodes , According to the current study, nine species of *Eimeria* were diagnosed as shown in table (1), with the highest incidence of *E.parva* type being recorded at an infection rate 14.4% and the lowest incidence of *E.weybridgeensis*

type with 2.2% infection, while the *Cryptosporidium Spp* parasite had a 1.8% infection rate (Table 1).

Table 1: The number and percentage of infection *Cryptosporidium*, *Eimeria* in sheep

NO	INTESTINAL PROTOZOAN	THE NUMBER OF SHEEP	PERCENTAGE %
1	<i>E. parva</i>	39	14.4
2	<i>E. crandallis</i>	34	12.5
3	<i>E. ahasta</i>	28	10.3
4	<i>E. pallida</i>	18	6.6
5	<i>E. ovinoidalis</i>	17	6.2
6	<i>E. bakuensis</i>	16	5.9
7	<i>E. faurei</i>	16	5.9
8	<i>E. intricata</i>	7	2.5
9	<i>E. weybridgensis</i>	6	2.2
10	<i>Cryptosporidium Spp</i>	5	1.8

Nematodes were also diagnosed by a flotation method with a saturated sugar solution, as the results of the study showed by examining fecal samples in sheep that the total infection rate was 42% of the total of 500 samples, and ten types of Nematodes were recorded when examining fecal samples in sheep, 210 fecal samples, 42%, had the highest rate of infection

of *Marshallagia marshalli* at 44.4%, followed by *Trichostrongylus spp* 14.0%, while infection with worms of *Ostertagia circumcincta* was 11.1%, and study animals suffered from their infection with *Haemonchus contortus* with a percentage of 8.8%, and *Strongyloides papillosus* showed the lowest infection rate of 2.9% Table (2).

Table 2: The number and percentage of infection with Nematodes in sheep.

No	Nematodes	The number of sheep infection	Percentage %
1	<i>Marshallagia marshalli</i>	120	44.4
2	<i>Trichostrongylus spp</i>	38	14.0
3	<i>Ostertagia circumcincta</i>	30	11.1
4	<i>Haemonchus contortus</i>	24	8.8
5	<i>Nematodirus spp</i>	16	5.9
6	<i>Chabertia ovina</i>	14	5.1
7	<i>Cooperia spp</i>	12	4.4
8	<i>Toxocara vitulorum</i>	10	3.7
9	<i>Oesophagostomum spp.</i>	9	3.3
10	<i>Strongyloides papillosus</i>	8	2.9

Cryptosporidium and *Eimeria* oocysts were diagnosed based on shape and length and width measurements of Oocysts Table (3). Also, eggs were diagnosed based on length and width measurements

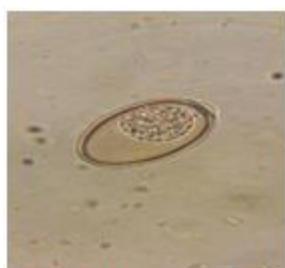
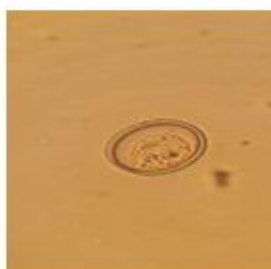
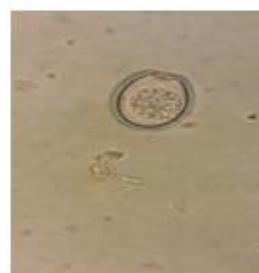
and number of embryonic cells inside the egg and as shown in Table (4).

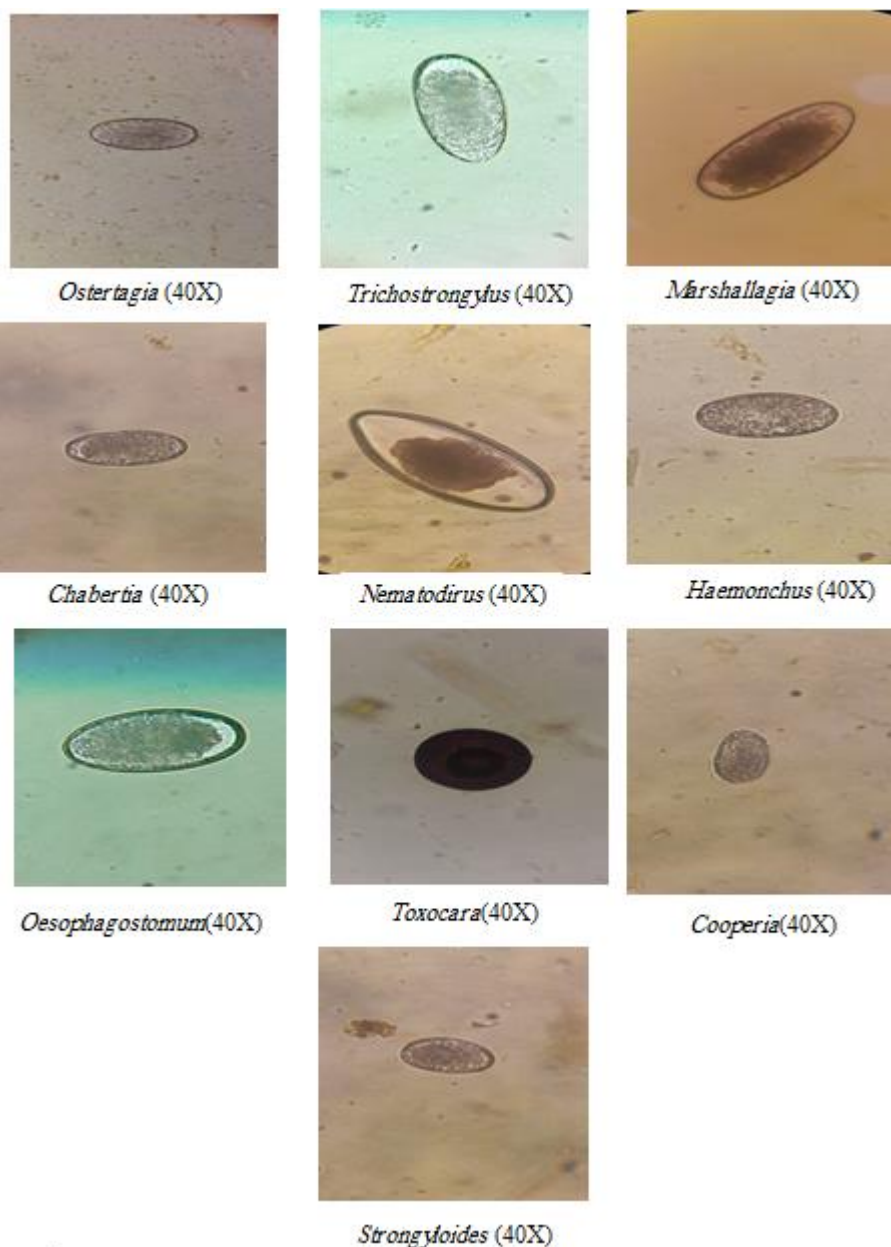
Table 3: Attributes and measurements of Oocysts for *Eimeria* and *Cryptosporidium* diagnosed in feces of examined Sheep

NO	TYPE	EGG MEASUREMENT (μm)		THE WEB	THE HAT	THE SHAPE
		WIDTH	LENGTH			
1	<i>E. parva</i>	10-19	15-22	-	-	Spherical
2	<i>E. ahasta</i>	19-30	25-47	+	+	Elliptical
3	<i>E. crandallis</i>	16-20	22-28	+	+	Elliptical or oval
4	<i>E. pallida</i>	10-16	14-20	-	-	Elliptical
5	<i>E. ovinoidalis</i>	18-23	23-30	-	-	Elliptical
6	<i>E. bakuensis</i>	16-24	23-36	+	+	Oval
7	<i>E. faurei</i>	17-25	24-34	+	-	Oval
8	<i>E. intricata</i>	31-38	40-50	+	+	Elliptical
9	<i>E. weybridgensis</i>	17-19	26-29	-	+	Elliptical or oval
10	<i>Cryptosporidium Spp</i>	-	4-6			Oval or spherical

Table 4: Measurements of diagnosed Nematodes eggs in infected sheep, measured in μm

NO	THE WORM	EGG MEASUREMENT (μm)	
		WIDTH	Length
1	<i>Marshallagia marshalli</i>	62-90	135-187
2	<i>Trichostrongylus spp.</i>	44-57	92-100
3	<i>Ostertagia circumcincta</i>	40-50	80-100
4	<i>Haemonchus contortus</i>	40-50	70-85
5	<i>Nematodirus spp</i>	100-112	200-230
6	<i>Chabertia ovina</i>	50-57	90-100
7	<i>Cooperia spp</i>	37-45	72-85
8	<i>Toxocara vitulorum</i>	70-75	75-98
9	<i>Oesophagostomum spp</i>	45-55	80-92
10	<i>Strongyloides papillosus</i>	25-30	50-62

*E. ahasta* (100X)*E. crandallii* (100X)*E. parva* (100X)*E. bakuensis* (100X)*E. faurei* (100X)*E. pallida* (100X)*E. weybridgeensis* (100X)*E. intricata* (100X)*E. ovinoidealis* (100X)*Cryptosporidium Spp* (100X)



Discussion

Examination of fecal samples from 500 sheep revealed that (54%) were positive for intestinal protozoa and nematodes, [9] reported similar percent (53.1%) with study on sheep in Kirkuk city, While our finding was lower than result (40.46%) detected by [10] in Erbil and with [11] in Sulaimaniya province 34.3%.

In the present study, the overall prevalence of protozoan parasite which included *Cryptosporidium* spp and *Eimeria* spp was (24%) these finding disagree with [12] in Al-Muthanna (67.5%).

Nine species of *Eimeria* were identified in this study, These results agreed with studies carried out in sheep in Mosul province, [13] but disagree with [14] were detected eleven species of *Eimeria* in sheep.

The high rate of infection was with the *E. parva* (14.4%) these results are identical with [15] in Sulaimaniya where the *E. parva* was more common

than among the genus of *Eimeria* but disagree with [16] which It was recorded in Baghdad, where the highest incidence of *E. ovinoidalis* was 18.5%, while the lower rate of infection was with *E. weybridgei* (2.2%) these finding agree with [17] Alsadoon (2018) in Baghdad, where the *E. weybridgei* recorded the lowest infection rate as it reached 2.5% but disagree with the results of [9] in Kirkuk, where they recorded the lowest rate of the *E. crandallis* at 21.7%.

The variation in the rates of infection may be due to the terms of samples collection, number of samples, climate, feeding of the sheep and their immunity and the type of examination. No clinical signs of coccidiosis were observed *Eimeria* caused considerable disease when the infected animals are being stress condition or under feeding and thus *Eimeria* could cause intestine pathogenesis [18].

The morphological features of oocysts that isolated by using flotation techniques, agree with the

description that given by [19], Examination of stained fixed samples revealed that (1.8%) were positive for *Cryptosporidium* spp. This result agreed with [20] in Baghdad (5.85%) and disagreement with [21] were recorded the height rate of *Cryptosporidium* (15.8%), while [22] found the prevalence of *Cryptosporidium* in sheep was (51%).

The appearance of detected *Cryptosporidium* oocysts stained with modified Zeihl-Neelson as spherical oocysts (4-6 μ m), bright red or pink and that agree with description of [14].

In the present study, the overall prevalence of nematodes parasite was (42%) these finding disagree with [23] in Baghdad (51.94%) and with [24] in Mosul (62.9%)

Ten genus of Nematodes were identified in this study ,these result disagree with [25] in the Kirkuk city ,were detected four genus of Nematodes in sheep.

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The variation in the rates of infection may be due to the infection rates, climatic conditions, different methods of breeding, sampling methods and random use of treatments.

The high rate of infection was with *Marshallagia marshalli* was (44%), these results are identical with [26] in Salah al-Din governorate where the *Marshallagia marshalli* was more common than among of Nematodes but disagree with [27] which It was recorded in Erbil , where the highest incidence of *Haemonchus contortus*, while the lower rate of infection was with *Strongyloides papillosus* (2.9%) these finding disagree with [10] in Erbil, where they recorded the lowest rate of the *Tricuris* spp. 2.79%.

Also, Nematodes were diagnosed based on measuring the size, length and width of the egg, These results are identical with [24][26].

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تشخيص الاوالي المعوية والديدان الاسطوانية في الاغنام في محافظة صلاح الدين

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الملخص

صممت هذه الدراسة من لتشخيص الاوالي المعوية والديدان الاسطوانية في الاغنام في محافظة صلاح الدين. اذ تم جمع (500) عينة براز من الاغنام من مناطق مختلفة من محافظة صلاح الدين للفترة من شهر تشرين الثاني 2019 ولغاية شهر نيسان 2020. اظهرت نتائج الدراسة ان العدد الكلي للعينات الموجبة للإصابة بالأوالي المعوية والديدان الاسطوانية 270 عينة وبنسبة إصابة (54%). كما اظهرت النتائج ان نسبة الإصابة الكلية للأوالي المعوية (24%)، اذ تم تشخيص تسعة انواع الایمیریا Eimeria في الاغنام ، فكانت اعلى نسبة اصابة لنوع *E. parva* بنسبة (14.4%) واقل نسبة اصابة لنوع *E. weybridgeensis* بنسبة (2.2%)، اما البويغات الخبيثة *Cryptosporidium Spp* فكانت نسبة الإصابة (1.8%).

اما نسبة الإصابة الكلية بالديدان الاسطوانية فكانت (42%)، اذ سجلت اعلى نسبة اصابة لجنس *Marshallagia marshalli* بنسبة (44.4%) واقل نسبة اصابة لجنس *Strongyloides papillosus* (2.9%).

تم تشخيص الاكياس البيضوية والبيوض للأوالي المعوية بالاعتماد على الصفات المظهرية والقياسات المثبتة في المصادر المعتمدة.