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Diagnosis of infection with hepatic worms in sheep in Salah al-Din governorate

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ABSTRACT

The present study was conducted to detect and diagnose *Fasciola spp.* in sheep in Salah al-Din governorate for period from September 2019 until March 2020.

The study included examining 200 fecal samples from both sexes, and the adult age group, by using sedimentation method and microscopic examination. The results showed the total rate of infection with *Fasciola spp.* was 5.5% (11/200). Distribution of infection according to period of study showed that the highest rate of infection was in January and February (79.13%) (34.10%) respectively, and no infection rate was observed in September and March.

The study showed the measurement of hepatic worms eggs isolated from infected sheep ranges between (142x80) μ m, ellipsoidal in shape with operculum and this features are within the eggs of *F. hepatica*.

Introduction

The livestock in Iraq is permanently exposed to infection by many different types of parasites, as they cause diseases that may eliminate many of them or reduce their production efficiency as well as affect their resistance, making them vulnerable to various diseases and the climatic and environmental conditions in Iraq help the spread and reproduction of these parasites and their survival. Active in different atmospheres, hepatic worms are one of the most important and dangerous liver worms that parasitize on herbivorous animals and cause great economic losses in these animals [1].

Hepatic worms, which is also known as Liver rot, caused by liver fluke, is one of the most important parasitic animal diseases spread in most countries of the world [2]. In addition to infecting humans [3].

The worms liver disease parasitic disease caused by *Fasciola hepatica*, *Fasciola gigantica* which settle in the liver and bile duct hepatobiliary system and rarely can be found in other locations within host body [4].

Among the most important pathological symptoms associated with infection with these worms are: weight loss, poor wool, lack of meat and milk production, wasting associated with newborns of infected mothers and low fertility, and thus deaths abound and morbidity occurs on a large scale in livestock as well as anemia and hypoproteinemia [5].

This disease is endemic in many geographical areas characterized by a humid climate and abundant intermediate host, and it is a type of snail of the genus *Lymnaea* [6]. The species *Fascoila hepatica* is found in temperate regions, while *Fascoila gigantica* is found in tropical regions, and both types are found in regions. Subtropics [7].

Given what sheep represent an important aspect of livestock and an important and essential source of income for breeders and the national of country [8]. [9] indicated that traditional diagnostic methods are usually used by sedimentation of feces to find eggs of adult worms that cannot be used after the parasite matures within 8-12 weeks.

This study was conducted to diagnose infection with hepatic worms in sheep in Salah al-Din governorate through microscopic examination of worms eggs in the stool.

Materials and Methods

The current study was conducted for period from September 2019 until March 2020, where 200 samples were collected from feces from sheep suspected of being infected with worms, from both sexes and the adult age group (2 years and older), and 15 samples were collected from animals without symptoms as a control group in Salah al-Din Governorate.

Fecal samples collection

Stool samples were collected directly from sheep rectum, suffering from one or more of clinical signs like: bottle jaw, poor wool and jaundice, using single-use paws. An appropriate amount of sheep feces was collected and then the samples were placed in clean containers containing ice to preserve the sample until reached the Parasitic Research Laboratory in Postgraduate Laboratory of College of Veterinary Medicine as well as in the National Laboratory in Nineveh Governorate, and it was stored in degree of 4 ° C until examination after about 2-3 days [10].

Laboratory examination:**Fecal examination:****sedimentation method:**

One to two gram of faeces was mixed with a small amount of 0.85% physiological salt solution in a glass baker, then supplemented with 40 ml of water, the mixture was filtered using a strainer, then transferred to 10 ml test tubes and centrifuged for 1500 cycles / Minute for 5 minutes, the floating liquid was poured and water was added to the sediment and the process was repeated 3-4 times for getting rid of the plankton.

Part of the precipitate was taken and placed on a slide glass using a Pasteur pipette and a glass slide was placed with cover slide cover and examined for diagnosing flukes eggs [11].

Egg measurement:

Fluke eggs isolated by sedimentation method were examined by using light microscope and measured by using Ocular micrometer [12].

Results

The results of this study indicated that the total rate of infection with fascioliasis was 5.5% (11/200) in adult sheep and of both sexes in Salah al-Din Governorate. The result showed that the highest rate of infection was in January, reaching (73.13%, 4/29), while no infection recorded in September and March. It was also found that the rate of infection in October and December, reaching (45.3%, 1/29) (57.3%, 1/28), respectively, while it recorded during November and February (90.6%, 2/29). (34.10%, 3/29) respectively, and no statistically significant difference was recorded between rate of infection in these months, table (1).

Table (1) Infection with Fascioliasis according to study months

the month	Number of samples examined	Number of samples infected with the eggs of the hepatic worms	The ratio %	Values P-Value	Values Chi-Square
September	28	0	0	0.176	8.950
October	29	1	3.45		
November	29	2	6.90		
December	28	1	3.57		
January	29	4	13.79		
February	29	3	10.34		
March	28	0	0		
Total	200	11	5.5%		

There is no significant difference at the level of significance $p > 0.01$

Isolated and diagnosed eggs:

The eggs isolated from the infected sheep were ellipsoidal in shape, yellow to brown in color with an operculum. The average length and width of hepatic worms diagnosed in the stool samples (142x 80 um) may fall within the measurements of the eggs of *F. hepatica* comparing with parasitic resources [13], (figure (1)).



Figure (1): *Fasciola* sp. egg isolated from sheep feces by using sedimentation method, (40X)

Discussion

The current study showed that the total rate of infection with eggs of *Fasciola* spp was 5.5% , this result is higher than that recorded by previous studies in Iraq by [14] in Baghdad and [15] in north of Iraq in Bardarash area in Dohuk governorate and [16] in Abu Ghraib in Baghdad, which is 28.2%, 2.5% and 73.2% respectively, and the current infection rate is higher than what was recorded [17] in Najaf, and it reached 50 for a period of three years, starting from 2016-2017-2018. 0%, 0.85% and 68.0%, respectively, as it was noted in the study [18] in Najaf that the percentage is 0.87%, while in Sulaymaniyah and Kirkuk it was 13.0% and 28.0%, which was recorded by each from [19;20] respectively.

Whereas, the rate of infection in the current study was lower compared to that recorded by [21,22,23] in southern Baghdad , Dhi Qar and Basra governorates, which were 27.4%, 22% and 2.7% respectively.

While the results of the current study were close to the results reached by [24] in Karbala, reaching 5.77%. The reason for the variation in the results may be due to the difference in the study areas, season of sample collection, and samples size. The emergence

of high rates in some studies is due to the suitability of the climate of these areas for the development and survival of intermediate host. It is noted that the high rates of infection in agricultural areas generate very favorable conditions of moisture and heat to complete the parasite's life cycle[25]. The animal grazing habits affect the epidemic of disease, and as a result of the lack of rain and green fodder, sheep owners resort to grazing their flocks in areas close to ponds and swamps, and sheep grazing on those weeds growing along those places that may be contaminated with infectious phase (metacercaria). The variation in infection prevalence may be attributed to large differences in climatic conditions and environmental factors, which play an important role in intermediate host abundance and worm egg development [17].

It was found through the current study that the highest rate of infection appeared in January and February, reaching (79.12%) (34.10%), respectively. This is in agreement with Abdulwahed, where the highest infection rate was in December and January (78.41%) (78.34%) respectively[26], and this result is consistent with what he found [27] in which he mentioned the highest rate during January and February. (Anon, 1999a)[28] also indicated that the rate of infection increased during December and the second due to the fact that the climate was cold and humid in Britain.

Our results do not agree with [21] in a study in southern Baghdad, where the highest percentage was recorded in summer and the lowest in autumn (35% and 7.22%), respectively.

No cases of infection were recorded in September and March, and this may be due to the fact that the contagious phase is present at the end of the summer and autumn [29]. Therefore, the reason for the

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increase in infection during October and November is due to the fact that Animals took the infectious phase and the disease incidence increased at autumn and winter, and this is consistent with what was mentioned by [30], And this study differs with [20] as it indicated a higher infection rate in March and April in Kirkuk. In Sulaymaniyah, [19] found a high rate in November, and that climate changes from wet summers and milder winters help to keep the infectious stages in the pastures. The proliferation of hepatic worms is closely related to the presence of their intermediate host (snails) that are able to adapt to the broad physical and chemical conditions that are important for the survival and reproduction of the snails and thus with the presence of hepatic worm [25]. And that the cystic cyst survives for a long time when the appropriate conditions are available, up to six months, as it was found that the decrease in precipitation leads to a decrease in the release of comets from the snails, while when the rains provide moisture and suitable soil and the temperature reaches (20 ° C) the infectious phase is released from the intermediate host to the weeds adjacent to ponds and swamps, and when ingested by the animal, the infection occurs and thus the level of infection rises in the months that have such conditions [31].

The technique used to diagnose eggs of liver worms in sheep feces is sedimentation technique and the eggs were clearly visible, where the eggs were distinguished by their oval-shaped shape, with a bright yellow to aqueous color with the clarity of the egg cover operculum and the rate of measurement ranges from 80 to 142 μ m and these characteristics are similar to the characteristics of eggs Type *F. hepatica*, which has been demonstrated in several studies[32].

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تشخيص الإصابة بالديدان الكبدية في الاغنام في محافظة صلاح الدين

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الملخص

أُجريت الدراسة الحالية للكشف وتشخيص الديدان الكبدية *Fasciola spp.* في الضأن في محافظة صلاح الدين والفترة من شهر ايلول 2019 ولغاية شهر اذار 2020 .

تضمنت الدراسة فحص (200 عينة) من براز الضأن ومن كلا الجنسين، وفئة الاعمار البالغة، وبأستخدام طريقة الترسيب والفحص المجهرى أظهرت النتائج أن نسبة الخمج الكلية في عينات البراز والمفحوصة بتقنية الترسيب كانت 5.5% (11/200)، أما بالنسبة لتوزيع الخمج حسب أشهر السنة كانت أعلى نسبة خمج في شهر كانون الثاني وشباط (13.79%) (10.34%) (4/29) (3/29) على التوالي ولم يلاحظ أي نسبة خمج في شهري أيلول واذار .

بينت الدراسة أن معدل قياس البيوض المشخصة في عينات براز الضأن الخمجة تتراوح بين (142x80) μm ، وذات شكل اهليلجي وتحتوي على غطاء وهذه الخصائص تقع ضمن معدلا صفات بيوض النوع *F. hepatica* .