

Diagnostic Study of *Nematodes* in Cattle in Mosul city
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Abstract

The present study was arranged to investigate the existence of different species of *Nematodes* which are infect the cattle through examination of 484 fecal samples which were collected randomly from Mosul city and around regions of it, during the period from October 2011 to June 2012 and determination infection severity of them.

The total percentage of infection with *Nematodes* was 23.34%. The significant variations in percentages of infection were recorded according to months of study. The highest percentage was in December 42.10% and the lowest in February 2.63%. In this study were diagnosed 13 genera of *Nematodes*, most of them *Haemonchus spp.* and *Ostertagia spp.*

In the estimation of infection severity with *Nematodes*, significant variations were showed among the light infection with both of moderate and severe infection and the highest percentage of light has accomplished to 67.25% and the lowest in moderate infection was 11.50%.

دراسة لتشخيص الديدان الخيطية في الإبقار في مدينة الموصل
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 الخلاصة

تم اجراء هذه الدراسة للتحقق من وجود أنواع مختلفة من الديدان الخيطية التي تصيب الماشية من خلال فحص 484 عينة برازية تم جمعها بشكل عشوائي من مدينة الموصل والمناطق المحيطة بها ، خلال الفترة من أكتوبر 2011 إلى يونيو 2012 وتحديد العدوى شدة منهم.

النسبة المئوية للإصابة بالديدان الخيطية كانت 23.34%. تم تسجيل الاختلافات الكبيرة في النسب المئوية للإصابة وفقاً لشهور الدراسة. وكانت أعلى نسبة في ديسمبر 42.10% والأدنى في فبراير 2.63%. في هذه الدراسة تم تشخيص 13 جنس من الديدان الخيطية ، معظمهم *Ostertagia spp.* و *Haemonchus spp.*

وفي تحديد شدة العدوى بالديدان الخيطية ، ظهرت فروق معنوية بين الإصابة الخفيفة مع كل من الإصابة المتوسطة والشديدة وحققت أعلى نسبة من الإصابة الخفيفة 67.25% وأدنى نسبة إصابة متوسطة 11.50%.

الكلمات المفتاحية : الديدان الخيطية ، الإبقار ، الموصل

Keywords: Cattle, *Nematodes*, Al-mousl

Introduction

Infection with *Nematodes* considered one of the affected diseases, distributed all over the world. The importance of these infections might be due to great economical losses (1). The percent of distribution of gastrointestinal parasites in calves depends on the type parasite, virulence of infection and an environmental condition of the animals (2). Several investigators in different area of the world has been take in consideration the epidemiology of *Nematodes* which infects cattle and calves, percent of distribution and their

diagnosis, for example in turkey Avcioglu and Balkaya (3) reported a prevalence of infection with *Toxocara vitulorum* in calves 22.2%, while in Ethiopia, Hiko and Wondimu (4) found an incidence of 54% of *Nematodes* infection with different species in dairy cattle. In Mosul city, Al-Farwachi (5) reported an incidence of infection with *Nematodes* 17.5% from the internal parasites in cattle. She observed that the cattle infested with different species of *Nematodes*. The most prevalence infested species included *Haemonchus* and *Ostertagia*. Abraham (6) also

isolated 8 types of *Nematodes* in stomach of cattle in Mosul city with a prevalence of 33.9% and the most infested type was *Haemonchus contortus*. Abdul-Hameed et al. (7) reported an incidence with infestation with *Nematodes* with different species in fatty calves in Goggeli region, the most prevalence infestation were with *Ostertagia* species. This study is conducted in order to increase information about infestation with *Nematodes* and lungworms in cattle, diagnosis and the virulence with different types of the *Nematodes*.

Materials and methods

484 fecal samples were collected from different areas of Mosul randomly collected from local cattle of different ages and from both sexes. The area of study includes: Al-Rahmania, Al-Rashidia, Arbajia, farm of Agriculture college, Al-Tahreer, Yarmja, Baaweza, Goggeli, Al-Jammasa, Al-Qahira, Al-Nahrawan, Al-Islah alzeraee and Hawe Al- Kaneesa. The study was conducted during the period from October 2011 to the end of June 2012. The samples were collected from rectum of the animal directly with Nylon gloves, then put in plastic clean container with information of number of animal, sex, date of samples collected were recorded. The samples were sending to the research laboratory of parasitology / College of Veterinary Medicine in order to do the laboratory examination. Macroscopic examination for fecal samples were done, taken in consideration the consistency, colour and the presence of worms if its present. Also laboratory examination for each fecal sample to detect the eggs of the *Nematodes* and the larvae of lung worms, through a swab taken directly from the feces according to (8). Floating method was used in sucrose solution (9). Baerman method was used to detect the larvae of lung worms and to isolate and diagnose the third stage of larvae of *Nematodes* after culturing of the samples (8, 9, 10). The numbers of *Nematodes* eggs were calculated in 1gm of fecal samples using modified Mc Master Method according to (11). The virulence of infection with cattle *Nematodes* were measured as follows: If the numbers of eggs less than 300 egg / gm of feces the virulence considered as light infection

; If it's between 300-500 egg / gm of feces it is considered as a moderate infection. While if it is more than 500 egg /gm of feces it is considered as a highly infection case (10, 12) . The eggs and larvae were photographed using digital camera.

Statistical analysis were done using sigma stat 3.0 program with the application at chi-square test at a level of 5% ($p < 0.05$).

Results

The results of the study showed that the prevalence of infection with *Nematodes* in cattle in the areas under the study was 23.34%. The highest prevalence of infection were recorded at December 2011 with an incidence of 42.10% , while the lowest incidence of infestation were recorded in February 2012 with a prevalence of 2.63%. There was a significant difference in prevalence of infection ($p < 0.05$) between different months of study. (Table 1).prevalence of infection ($p < 0.05$) between different months of study. (Table 1).The results also showed that the prevalence of infection with *Nematodes* in male animals was 53.55% out of 295 males examined. While in females the prevalence was 58.73% out of 189 female examined. There was no significant difference between different sexes in prevalence of infection. (Table 2).In this study, 13 species of *Nematodes* were diagnosed. The highest prevalence was found with *Haemonchus spp.* with a percent of 27.13%, then the infection with *Ostertagia spp.* with a percent of 26.39%. The lowest prevalence were recorded with *Capillaria bovis* and *Trichuris spp.* with a percent of 0.74%. The percentage of infection with lung worm *Dictyocaulus viviparus* was 7.06%. (Table 3). The types of *Nematodes* eggs belonged to the family Trichostrongylidae were diagnosed after the recovery of the 3 larvae from fecal culture and diagnosed according to the shape characteristics, size of larvae, the anterior end of the larvae and the total length of larvae, length of oesophagus and the tail length of the sheath and its shape (Figure1). The larvae of lung worms *Dictyocaulus viviparus* were diagnosed after fecal examination with Baerman method. The length of the larvae reaches 330-450 g. The larvae when characteristic with absence of the anterior

projection, the intestinal cells of the larvae contained brown colour nutritive granules and the larvae are relatively inactive and showed slow motion and having twisted motion (Figure 2). The results also showed that there was a significant difference between different infections with different types of *Nematodes* according to the mode of infection. The highest prevalence of infection with *Nematodes* were in mixed infection with three types or more with a percent of 46.90%, then with single infection with a percent of 32.74%, while the lowest percent showed in double infection with a percent of 20.35% (Table 4).

The measurement of virulence of infection with *Nematodes* according to the numbers of eggs released in one gram of feces, the highest percent were found in light infection 67.25%, while the percent reaches 11.50% at the moderate infection. There was a significant difference ($p < 0.05$) between the light infestation as compare with moderate and heavy infection (Figure 3).

Discussion

The study showed that the total prevalence of infection with different types of *Nematodes* were 23.34%. These results were in agreement with Alim et al. (13) who observed relation with total percent of infection with different types of gastrointestinal parasites with exception of the other difference in different worms between male and female cattle. This results were agreed with other studies by many investigators (1, 18, 19). In this study 13 species of *Nematodes* were diagnosed in different percent of infection. The highest percent were reported with infection with *Haemonchus spp.* with a percent of 27.13%. This result was agreed with several authors in Al-Mosul city who reported a prevalence an infection with bovine *Haemonchus spp.* (5, 6, 20). The results also agreed with Muhaidi (17) who observed a higher percent of infection with in *Haemonchus spp.* in in bovine of Baghdad. Habtemicheal et al. (21) reported a prevalence of 27.8% with *Haemonchus spp.* in bovine in Oromia, Ethiopia. The percentage of infection with lung worms *Dityocaulus viviparus* was 7.06%. This result was agreed with Lat-Lat et al. (22) who observed a prevalence of 5.0% in

bovine in Malaysia while Hiko and Wondimu (4) reported a percent of 0.5% in Ethiopia. In Iraq it has been observed a prevalence of bovine lung worm infection were 19.4% (23). The difference between the incidence of lung worm in cattle in different regions may be due to different seasons of rain, different periods of rainfall in different regions as well as differences in climate in terms of temperature and humidity in different regions and the different ages of animals examined and the different immune status of animals. Against the infection of these worms (24). The study showed that there were significant differences between the rates of infection of different types of *Nematodes* in different modes of infection, and the highest rate of infection in three or more mixed cases, which amounted to 46.90%. This is agreed with what Mohammed (20), indicating that the highest incidence was with mixed infection by 66.6%, and the rate of single infection was 32.74%. It was related to Mohammed (20), where the rate of single infection was 33.4%, and may be due to the contamination of pastures with the eggs of different types of *Nematodes*, resulting in the injury of one animal more than one type of these worms, as well as climatic conditions suitable for development Larvae of various kinds of *Nematodes* on grasses in the field.

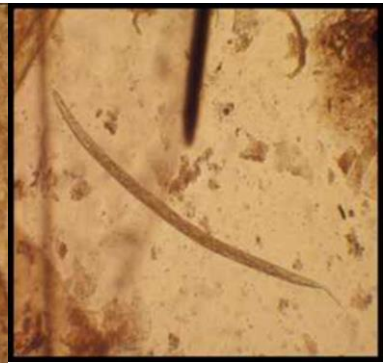
In the estimation of the severity of infection of different types of *Nematodes* in the cattle, the rate of light infection was high at 67.25% compared to the incidence of moderate and severe, at 11.50% and 21.23%, respectively. With a significant difference between light infection with both moderate and severe infection at a significant level ($P < 0.05$). The results of this study were agreed with many studies that indicated that light infection was prevalent and was the highest rate (4, 25, 26), Light infection is an economic problem in terms of the severe impact on animal health, delayed growth and decreased productivity, and infected animals are a source of contamination and infection in the field (27).



larva of *Trichostrongylus* spp. X100



Larva of *Cooperia* spp. X100



Larva of *Haemonchus* spp. X 100



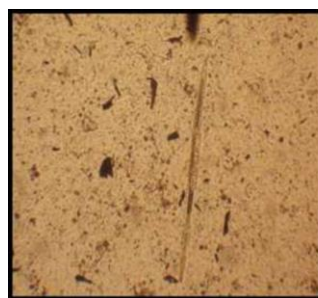
posterior end of *Trichostrongylus* spp.(larva) X100



Anterior end of *Cooperia* spp. (larva)X400



Posterior end of *Haemonchus* spp.(larva) X100



Larva of *Bunostomum phlebotomum* X100



Larva of *Ostertagia* spp.X100

Figure (1) Third larvae of some worms of *Trichostrongylidae*



Figure (2): Larva of *Dictyocaulus viviparous* in cattle X100

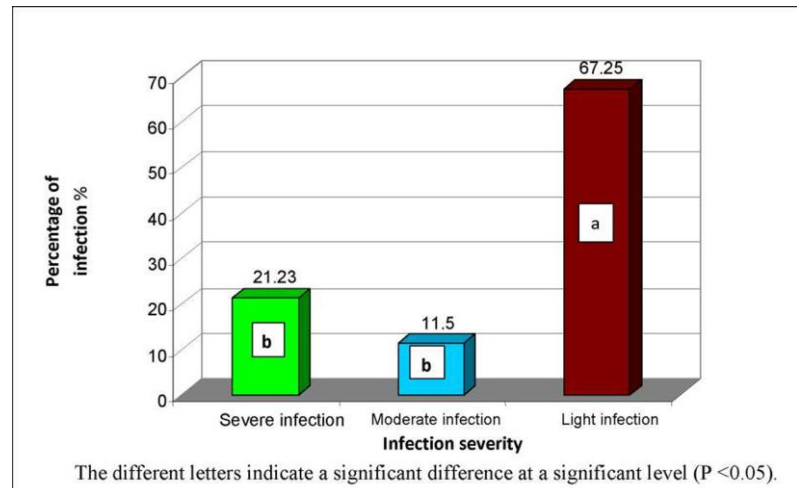


Figure (3): The incidence and severity of *Nematodes* in cattle

Table (1): Numbers and percentages of infection of the different types of *Nematodes* in the cattle according to the months of the year

Month	No. of examined animals	No. of infected animals	Percentages of infection %
October 2011	62	17	27.41 a,c
November	46	18	39.13 A
December	38	16	42.10 A
January 2012	60	24	40.00 A
February	76	2	2.63 B
March	43	9	20.93 a,c,d
April	44	13	29.54 a,c
May	44	3	6.81 b,d
June	71	11	15.49 c,d
Total	484	113	23.34

The vertically different letters indicate a significant difference at a significant level ($P < 0.05$).

Table (2): Numbers and percentages of infection of *Nematodes* in cattle and their relationship with the sex of the animal

1 Gender	No. of examined animals	No. of infected animals	Percentages of infection %
Males	295	69	23.38
Females	189	44	23.28
Total	484	113	23.34

There was no significant difference at a significant level ($P < 0.05$).

Table (3): Numbers and percentages of infection of *Nematodes* in cattle

1 Type of parasite	No. of infected animals	Percentages of infection %
<i>Haemonchus spp.</i>	73	27.13
<i>Ostertagia spp.</i>	71	26.39
<i>Trichostrongylus spp.</i>	36	13.38
<i>Strongyloides papillosus</i>	29	10.78
<i>Chabertia ovina</i>	19	7.06
<i>Capillaria bovis</i>	2	0.74
<i>Trichuris spp.</i>	2	0.74
<i>Oesophagostomum radiatum</i>	24	8.92
<i>Nematodirus spp.</i>	15	5.57
<i>Toxocara vitulorum</i>	10	3.71
<i>Bunostomum spp.</i>	7	2.60
<i>Cooperia spp.</i>	8	2.97
<i>Dictyocaulus viviparus</i>	19	7.06

Table (4): Modes of infection of *Nematodes* in cattle

Mode of infection	No. of infected animals	Percentages of infection %
Single infection	37	a 32.74
Double infection	23	b 20.35
Mixed infection with three types or more	53	c 46.90
Total	113	23.34

The different letters indicate a significant difference at a significant level ($P < 0.05$).

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