



Investigations on Gastrointestinal Parasites in Camels Rearing in Nineveh Governorate



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DURING the present investigation a total of 120 faecal samples from camels were examined to determine the distribution of gastrointestinal parasites infestations in camels rearing in Nineveh, Iraq.

About 96 camels were found to be infected by variant parasites, with total of 80% infection rate. Protozoan infection was 60% among these camels. Animals were found to be infected with *Cryptosporidium spp.*, *Eimeria spp.*, *Giardia spp.* and large protozoan *Balantidium coli*. Helminthes were also prevalent in these animals, among which 27.5 % were nematodes including *Toxocara spp.*, *Trichostrongylus spp.*, *Haemonchus spp.* and *Trichuris spp.* Amongst Trematodes *Dicrocoelium spp.* and cestode such as *Moniezia spp.* were also found with 5% infection rate.

No significant difference ($p \geq 0.05$) in infection between both sexes of camels was found. High infection rate was found in young camels (under 5 years old) in comparison to adult animals ($p \geq 0.05$).

Camels showed carriage of single type of infection (43.75%) with parasites higher than those with mixed infection.

Keyword: Gastrointestinal parasites, Camels, Nineveh governorate.

Introduction

Camels are considered as an economic animals and being used as a source of meat, milk and leather industry [1,2]. They belong to the family Camelidae [3] and the genus *Camelus* has two species, those with single hump is *C. dromedaries* (Arabian camel), whilst those with two humps is *C. bactrianus* [4].

Gastrointestinal parasites cause health problems affecting animal's nutrition and may lead to decrease productivity and diarrhea to the infected camels [5, 6].

In Iran, the rate of infection in camels with

different types of nematodes reached (75.1%) of total animals [6]. In Jordan in other study, the parasite eggs were detected in 98% of camels there [7].

Camels in Iraq did not receive any attention relating to the investigation with gastrointestinal parasites. According to Karawan [8], camels were infected with 36.83% (what the type of infection they recorded) in Al-Diwaniya governorate. Whilst Anisimova & Al-Fatlawi [9] reported *Moniezia expansa* in camels in small intestine with 15.38% and 32.35% infection rates in animals in Al-Diwaniya and Najaf respectively. In Nineveh, Iraq no studies were available regarding

infection of camels with gastrointestinal parasites. In northern Iraq including Nineveh there are some flocks of camels rearing different regions, however, with no accurate information about their population.

The aim of the present study was to obtain data regarding infection of camels in this governorate with gastrointestinal parasites and to assess infection rate. Moreover, to determine the different species of these parasites in camels in this part of the country.

Materials and Methods

Locations

Faecal samples were collected from camels grazing in different location of Nineveh province, Al-Hathar and Baaj.

Numbers of samples

A total of 120 faecal samples were obtained from camels from of different ages and sexes male (78) and female (42) Table 1.

Sample collection: Samples were obtained directly from the rectum of camels, placed in clean plastic containers with covers. They containers were identified with labels regarding places of animals and faecal consistency. These samples were transferred to the Parasitology laboratory at the College of Veterinary Medicine, University of Mosul for subsequent laboratory examination.

Tests used

All the samples were subjected for direct, flotation and sedimentation techniques. Sheather's sugar solution was prepared [10] in the laboratory and used for flotation techniques for the egg of nematodes, cestode, and oocysts of protozoa [11]. The detection of *Cryptosporidium* oocysts, a Modified Zeihl-Nelsen staining technique was used as described by Taylor et al. [12].

Morphological studies and morphometric measurements of helminths and developmental stages of protozoa were made for the identification of these parasites according to Soulsby & Taylor et al. [11, 12].

TABLE 1. Numbers of samples in both sexes of camels.

Sex	Number of animals
Males	78
Females	42
Total	120

Egypt. J. Vet. Sci. Vol. 52, No.1 (2021)

Photographs of the eggs and oocytes were obtained by using digital camera Sony, 16.1MP, Japan, the magnification used (370x).

Statistical Analysis

The population size of animals used in this study was good enough (N: 120 animals) to compare the prevalence rates (%) of internal parasites in 120 camels according to the comparison of two proportions independent groups as stated by Petri and Watson [13] using sigma state software program V.

Results

Results recorded that microscopic examination of 120 faecal samples had as high as 80% infection rate with gastrointestinal parasites in animals in this study. The number of animals infected with protozoa was 75 with about 62.5% (Table 2). Results also revealed that camels were infected with *Cryptosporidium spp.*, *Eimeria spp.*, *Giardia spp* (Fig.1-4) in addition to the large intestinal protozoa *Blantidium coli*.

The number of camels infected with nematodes was 33 with 27.5% infection rate where the detected nematodes were *Toxocara sp.*, *Trichuris sp.*, *Trichostrongylus sp.* and *Haemonchus sp.* (Fig.5,6). Amongst Trematodes, *Dicrocoelium sp.* (Fig.7) was detected. However, *Moneizia spp.* was the single cestode reported with 5% infection rate (Fig.8).

Statistical analysis showed no significant differences ($p \geq 0.05$) between sexes of camels in this study (Table 3).

The rate of endoparasites infection in this study 84% in camels below 5 years old and 27.2% in camels aged between 15-10 years old. However, 67.5% infection rate in animals older than 10 years old (Table 4).

Faecal specimens show various genera of parasites infecting gastrointestinal tract (Table 5). The single type of infections (43.75%) was the highest and concurrent infections were with double 32.03%, triple 21.88% and quadruple 2.08%.

Discussion

During the present study an attempt was made to determine the rate of infection and know types of gastrointestinal parasites in camels in Nineveh province. Up to our knowledge, no other previous study on these animals was made in this province

TABLE 2. Number and percentage of infection rate in camels with gastrointestinal parasites

Group of parasite	Genus	Number of infected animals	Percent of infected animals	Percent of infected animals total population
Protozoa	<i>Cryptosporidium</i>	45	60.00 ^a	62.50 ^a
	<i>Eimeria</i>	22	29.00 ^b	
	<i>Giardia</i>	5	6.70 ^b	
	<i>Blantidium</i>	3	4.00 ^b	
	<i>Toxocora</i>	20	61.00 ^a	
Nematode	<i>Trichostrongylus</i>	6	18.00 ^b	27.50 ^b
	<i>Trichuris</i>	4	12.00 ^b	
	<i>Haemonchus</i>	3	9.00 ^b	
	<i>Dicrocoelium</i>	6	5.00 ^c	
Trematode	<i>Dicrocoelium</i>	6	5.00 ^c	5.00 ^c
Cestode	<i>Moneizia</i>	6	5.00 ^c	5.00 ^c

a-c Proportions within columns with different lettered are significantly different ($P \leq 0.5$).

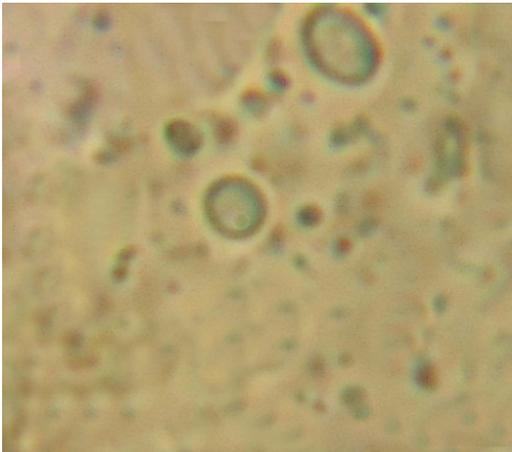


Fig. 1. *Cryptosporidium* sp. 40X



Fig. 2. *Cryptosporidium* sp. 40X



Fig. 3. *Eimeria* sp. 40X

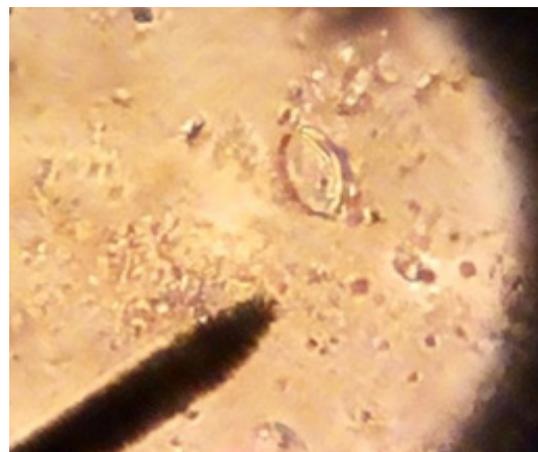


Fig. 4. *Giardia* sp. 40X

TABLE 3. Number and infection rate with internal parasites in both sexes of camels.

Sex	Number of infected animals	Number of non-infected animal	Prevalence rate (%)
Males	62	16	79.40 ^a
Females	34	8	80.90 ^a
Total	96	24	80%

a-a showed significant high similarity ($p \leq 0.05$) in the occurrence of internal parasites in sexes of animals

**Fig. 5. *Trichuris* sp. 10X****Fig. 6. *Haemonchus* sp. 10X****Fig. 7. *Dicrocoelium* sp. 10X****Fig. 8. *Moniezia* sp. 10X**

TABLE 4. Rate of infection (%) with gastrointestinal parasites according to the ages of camels.

Age groups (years)	Number of examined animals	Number of non-infected animal	(%)Infection
1. > 5 Yrs.	25	21	84.00 ^a
2. (5-10) Yrs.	55	48	27.20 ^a
3. > 10 Yrs.	40	27	67.50 ^b
Total	120	96	80%

a-c Proportions within columns with different lettered are significantly different ($P \leq 0.5$).

TABLE 5. Number and percentage infection with internal parasites in a random group (n=96) camels according to type of infection.

Type of infection	Number of infected camels	Prevalence (%)
Single	42	43.75 ^a
Double	31	32.30 ^{ab}
Triple	21	21.88 ^b
Quadruple	2	2.08 ^c
Total	96	80%

a-c Proportions with different lettered superscripts are significantly different ($P \leq 0.5$).

of the country. Therefore, it may be considered the first study in Nineveh province, Iraq. This study reported 80% infection rate with gastrointestinal parasites in camels, where Karawan [8] reported 86.36% infection rate in camel in Al-Diwaniya province (South Iraq) which considered close to the result reported in the present work. Moastafa et al. [14] reported higher infection rate (89%) in Jordan. Alhakak [15] reported lower infection rate 17.2% in animal's grazing in Karbala, Al-Najaf province. While, Anvari-Tafti, et al. [5] recorded 75.1% in Iran. Ibrahim et al. [16] reported 50.3% in camels in Somalia. Differences in these results may attributed to geographical, climatic factors and perhaps to the population samples in these studies. In addition, it may affect by the techniques used in examination of the fecal samples, management conditions and the ages of camels.

The results of this study showed that camels in Nineveh were had mixed infection with different helminthes and protozoa parasites. The rate of infection was 27.5%, 62.5% for nematodes and protozoa respectively. However, the rates of infection with *Dicrocoelium* (Trematode) were 5% and 5% for *Moniezia spp.* (cestode). Similar results were obtained by other workers in camels [15,17-19]. The rate of infections with intestinal parasites reported here were 79.4% and 80.9% in males and females animals respectively with non-

significant difference ($p \geq 0.05$) coinciding with that of some authors[20,21] in other countries.

This results are unmatched with that of Fadhil & Al-zubaidi [22] in Al-Najaf abattoir-Iraq who reported significant different ($p < 0.05$) between females and males infection rate 37.5% ,26.52% respectively. Al-Magrin [20] showed a significant differences between male and female in infection of camels in Saudi Arabia .This variation may be related to the different infection of parasites as well as the different of age animals and method of examination.

Significant differences ($p < 0.05$) with gastrointestinal parasites were reported in various ages groups of camels in this study. Young camels (below 5years old) were significantly infected ($p < 0.05$) with gastrointestinal parasites compared to older animals. Similar result was obtained with other investigators in the same host [19, 23-25] .

Single type infection i.e. with one parasite reaching 43.7% among enteric parasites was prevalent when compared with mixed infection. Similar results were reported by Al- Megrin [20] in Saudi Arabia.

This results are controversial with that of Al-Tae et al. [26] in South Iraq who reported 56.1% infection rate for mixed infection in camels. Ibrahim et al. [16] reported that 56.0%

of the infected camels revealed mix-infection of different parasites species in Somalia.

More studies are required to know the variety of endoparasites and ectoparasites infecting Camels in this country. Not in the range of this paper.

Acknowledgment

The authors are very grateful to the University of Mosul/College of veterinary medicine for their provided facilities, which helped to improve the quality of this work.

Conflict of interest

The authors declare that there are no conflicts of interest regarding the publication of this manuscript

Funds statement

The authors received no specific funding for this study.

Ethical consideration

All Ethical consideration had been taken during dealing and sampling with study animals

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التحري عن طفيليات المعدة والامعاء في الجمال المرباة في محافظة نينوى

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تبين خلال التحري الحالي لـ ١٢٠ عينة براز من الجمال فحصت لتحديد انتشار الخمج بديدان المعدة والامعاء في محافظة نينوى في العراق. ولوحظ وجود حوالي (٩٦) جملا يعانون من الاصابة بهذه الطفيليات حيث بلغت نسبة الاصابة الكلية (٨٠٪) وبلغت النسبة المئوية للخمج بالاولي الطفيلية (٦٠٪) وجدت الحيوانات خمجة بالانواع (*Cryptosporidium sp.*, *Eimeria sp.*, *Giardia sp.*, *Blantidium coli*) و لوحظ وجود الديدان الاسطوانية في هذه الحيوانات فقد بلغت النسبة المئوية للخمج حوالي (27.5%)، والتي تضمنت الأنواع المثقبية من النوع *Dicrocoelium sp.* والديدان الاشريطية من النوع *Moniezia sp.* حيث بلغت نسبة الخمج بكليهما (5%).

ولم تظهر اية فروقات معنوية بين اجناس الجمال وكانت نسبة الخمج مرتفعة في صغار الجمال (اقل من خمس سنوات) عند مقارنتها مع الحيوانات البالغة. ولوحظ الخمج المفرد بنوع واحد من الطفيليات في الجمال وبنسبة (43,75%) مقارنة بالخمج المختلط بأكثر من نوع واحد من الطفيليات.

الكلمات المفتاحية: طفيليات المعدة والامعاء، الجمال، محافظة نينوى.