

Prevalence of internal parasites in camelids (*Camelus dromedaries*) in Bediat Al- Samawah

Karima Akool Al Salihi ¹ <https://orcid.org/0000-0002-5698-2678> ; Ali Naser Kathem ¹

¹ Department of Internal and Preventive Veterinary Medicine/ College of Veterinary Medicine, AL Muthanna University/ AL Muthanna, Samawah, Iraq.

ARTICLE INFO

Received: 12.04.2021

Revised: 02.06.2021

Accepted: 05.06.2021

Publish online: 08.06.2021

***Corresponding author:**

Professor Karima Akool Al Salihi:

Email address: kama-akool18@mu.edu.iq

Abstract

Internal parasite infestation is slightly not well studied in camelids in Iraq. Only a few reports of research have been done on *Camelus dromedaries* in Iraq in general and Bediat Al- Samawa in particular in comparison to other livestock such as bovine, caprine, and ovine. Subsequently, this study intends to investigate the prevalence and identification of gastrointestinal parasites in feces samples of dromedary camels (*Camelus dromedaries*) in Bediat Al- Samawa/ Al Muthanna

province/ Iraq based on microscopical examination. Seventy-six fresh fecal samples collected from 3 herds at Bediat Al- Samawah near Sawa Lake /Al Muthanna province / Iraq were processed for microscopic examination using concentration by formalin-ether sedimentation and flotation procedure. Moreover, modified Ziehl-Neelsen staining and Lugol staining methods were used to detect *Cryptosporidium spp.* and Giardia cysts, respectively. The microscopical examination approved the presence of various parasitic spp in examined fecal samples. The percentages of gastrointestinal parasites were 52.46% (39 out of 76). The protozoal infections were reported at 19.55% (14 out of 76), while helminth infections were reported at 21.71% (16 out of 76). Mixed infection was also reported in some cases, and the percentage of protozoan and helminths was 8.44% (6 out of 76). This study revealed no correlation between infection and some factors such as the animal's age, nature of feces, and sex of the animals. The results of this study revealed the following genera: protozoa, Nematoda, Cestoda, and Trematoda. The highest percentages of parasitism were occurred by *Strongyloides spp.* and *Eimeria spp.*; however, *Cooperia spp* revealed the lowest percentages of infection. Moreover, *Cryptosporidium spp* was reported in 2.63% (2 out of 76) examined samples. In conclusion, this study approved parasitic gastrointestinal infections in the digestive system of camelids (*Camelus dromedaries*) in Bediat Al- Samawa/ Al Muthanna province/ Iraq. The reported parasites are analogous to parasites fauna reported in other ruminants, expressing an essential challenge to animal farming. The author recommends another future study to be focused on the relationship between the camelid's gastrointestinal parasites and parasites of other farm animals and to understand its epidemiology and their economic influences on public health.

To Cite this article: Karima Akool Al Salihi, Ali Naser Kathem (2021). Prevalence of internal parasites in camelids (*Camelus dromedaries*) in Bediat Al- Samawah. (2021). MRVSA. 10 (1): 26-32. [Doi: http://dx.doi.org/10.22428/mrvsa-2021-00101-03](http://dx.doi.org/10.22428/mrvsa-2021-00101-03)

Keywords: Bediat Al- Samawah, *Camelus dromedaries*, *Eimeria spp.*, helminths, protozoans.



Introduction

Camel is a large animal with long-necked, humped, even-toed ungulates and including in the mammalian genus *Camelus* of the Camelidae family. The camelids are found in different countries around the world. Globally, there are 20 million camels, according to FAO, and the majority (about 15 million) of these camels were settled in Africa, while Asia has the rest of the number (Al Salihi *et al.*, 2018; Abdul Al-Rahman *et al.*, 2020). Camelids are important livestock for their milk and meat productions and are still used in some countries for transportation and across the deserts between different Asian and African countries (Al Salihi, 2016). According to Al-Salihi, (2012), there were 58,000 in Iraq in 1978. All these camels are one-humped and commonly distributed in certain provinces in Iraq. However, the statistical survey of livestock in 2008 in Iraq found only 51,703 head camels. The livestock census, which was conducted between 2012 and 2014, approved the increment in the number of camels to 88,282 heads (Talal *et al.*, 2020).

Like other farm animals, camelids are susceptible to different infectious and non-infectious diseases (Fowler, 2010). Moreover, previous studies mentioned that camelids are prone to parasitic diseases (Ahmed *et al.*, 2018; Dubey & Schuster, 2018; Oksanen and Lavikainen, 2015; Saeed *et al.*, 2018; Sazmand & Joachim, 2017; Al Salihi, 2018) and causing considerable economic losses related to decrease in the performance and productivity of the infected camels as well as mortality in severe cases (Sazmand & Joachim, 2017; Bekele, 2002). Studies from various countries approved the importance of gastrointestinal parasites like protozoa and helminths in camelid populations (Dubey & Schuster, 2018; Narnaware *et al.*, 2017).

In Iraq, studies on gastrointestinal parasites in camelids have been done in some provinces (Zahra M. Al-Hakak, 2018; Al Salihi, 2018; Azhar, 2017). However, herds of camelids in Iraq is still suffering from many debilitating diseases, including vector-borne and blood parasites such as babesiosis, rickettsiosis, and trypanosomosis (Bennoune *et al.*, 2013; Bouhous *et al.*, 2008; Djerbouh *et al.*, 2012), as well as tissue *Echinococcus spp* (Al Salihi, 2018).

Searching in review literature revealed scarce publications on camels gastrointestinal parasite infestation in Badiat Al- Samawa/ Al Muthanna province/ Iraq. Moreover, little attention to gastrointestinal diseases as a problem was paid at the herd level. Subsequently, this study intends to investigate the prevalence and identification of gastrointestinal parasites in feces samples of dromedary camels (*Camelus dromedaries*) in Badiat Al- Samawa/ Al Muthanna province/ Iraq based on microscopical examination.

Materials and methods

This study was extended from February to June 2018 on three herds of camel (*Camelus dromedaries*) at Badiat Al- Samawah near Sawa Lake /Al Muthanna province / Iraq. Al Muthanna governorate is located 280 kilometers (174 miles) southeast of Baghdad in the middle point between Baghdad and Basra. This area is characterized by a desert climate, in summer temperatures over 40°C, while rainfall is scarce and limited to the winter months. Geographically, it is a sandy desert with ridges, and many camel owners live a nomadic life, migrating from one place to another looking for grassland and Water



oases. Moreover, desert plants and periodic pastures of diverse concentrations are dominated in this area with average High Temperatures are 15°C (January) to 42°C (July), while the average Low Temperatures are 7°C (January) to 30°C (July) (Figure. 1). Different animal species such as goats, sheep, and cows have been raised in the same area besides camels.

Seventy-six fresh fecal samples were collected from camels either directly or from the ground immediately after defecation. Each sample was kept in a sterile plastic container, labeled with the epidemiological data, and transported to the laboratory of clinical pathology/ College of Veterinary Medicine/ Al Muthanna University for further processing. This study was approved by the animal and research ethical committee at the college of veterinary medicine/ Al Muthanna university. All samples were examined grossly to assess the consistency of the feces and to check for visible parasitic elements. Later on, the fecal samples were processed for microscopic examination after concentration by formalin-ether sedimentation.

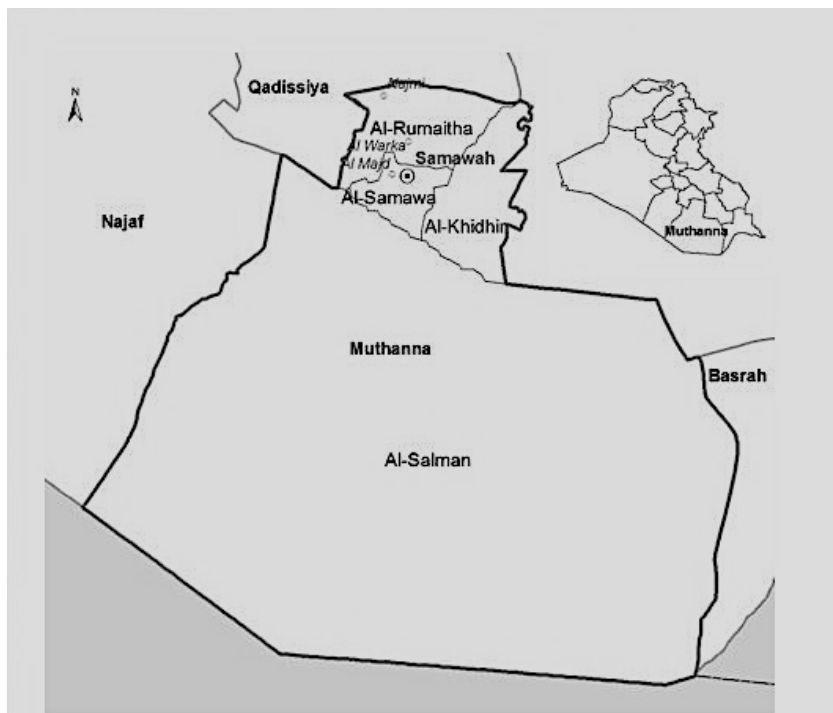


Figure.1: Shows the area of the study

Additionally, all samples were processed by floatation technique (NaCl solution of 1.2 density). The microscopic examination of *Cryptosporidium spp.* was done by modified Ziehl-Neelsen staining procedure while Lugol staining technique was used to detect Giardia cysts. Moreover, based on detecting eggs and oocysts excretion in the feces, the genus identification was made. A semi-quantitative scoring method was used for the detection of *Cryptosporidium spp.* Oocysts infestation using X40 objective lens, and the number of oocysts was calculated in 200 fields/ slide. The scores of positive slides were established as (+), (++) , (+++) for less than five oocysts per slide, 1 to 10 oocysts per field of view, and 11 or more oocysts per field of view, respectively. The total



percentage of infection and percentage of the prevalence of each species of parasites were determined using statistical analysis.

Results

The microscopical examination revealed the presence of various parasitic spp in examined fecal samples. The total percentage of gastrointestinal parasites was 52.46% (39 out of 76). Various species of parasites were recognized in this study, including the following: the protozoal, helminths, Mixed infection (protozoan and helminths), and *Cryptosporidium spp* at the percentages of 19.55% (14 out of 76), 21.71% (16 out of 76), 8.44% (6 out of 76) and 2.63% (2 out of 76) respectively (Table.1). This study revealed no correlation between infection and some factors such as the animal's age, nature of feces, and sex of the animals. The results of this study revealed the following genera: protozoa, Nematoda, *Cestoda*, and *Trematoda*. The highest percentages of parasitism were occurred by *Strongyloides spp.* and *Eimeria spp.*; however, *Cooperia spp* was revealed the lowest percentage of infection, 1.31% (1 out of 76). Moreover, *Cryptosporidium spp* was reported in 2.63% (2 out of 76) examined samples.

Table.1: Shows the infection rate of identified categories gastrointestinal parasites in examined camels.

Identified parasites	Number of infected camels	Percentages of infection
protozoal	14	19.55%
helminths	16	21.71%
Mixed infection (protozoan and helminths)	6	8.44%
<i>Cryptosporidium spp</i>	2	2.63%

Discussion

Scarce information is available regarding the epidemiology of gastrointestinal parasitic infestation in dromedary camels in Bediat Al- Samawa/ Al Muthanna province/ Iraq. The present study results indicated that the overall infection rate was 52.46% (39 out of 76) examined samples. These findings agree with those reported previously by others in African and Asian countries (Bekele, 2002; Abdel-Rady, 2014; Borji et al., 2010). The result also agrees with previous national studies in other Iraqi provinces (Zahra M. Al-Hakak, 2018; Al Salihi, 2018; Azhar, 2017). The parasitic infections of camels are likely to depend on several factors, such as environmental and host-related factors. Climatic factors and farming practices are important environmental factors, whereas animal breed, age, and population density are host-related factors. Other factors affected by this kind of investigation are the method, sampling time, and the number of screened animals. All these factors have an obvious impact on the current study results that recorded a high percentage of parasitic infestation, 52.46% (39 out of 76). This study also showed that the protozoal infections were reported at 19.55%, while helminth infections were reported at 21.71%. But the mixed infection was also reported in some cases, and the percentage of protozoan and helminths was 8.44%. These results are



compatible with previous observations reported by another researcher (Radfar & Aminzadeh, 2013; Anwar and Khan,1998). These studies approved that both protozoan and helminthic are commonly associated with livestock, including camelids. Different genera of nematodes and protozoa were recorded in this study, such as *Strongyloides spp.* and *Eimeria spp.*, but these results are incompatible with previous studies (Abdel-Rady, 2014; Radfar & Aminzadeh, 2013). Additionally, *Oesophagostomum spp.*, *Trichostrongylus spp.*, *Dictyocaulus spp.*, *Chabertia spp.*, *Ostertagia spp.*, *Cooperia spp.*, and *Fasciola spp.* were seen as individual cases. However, the results of the current study showed somehow higher percentages compared to those reported previously from different African and Asian countries. The percentage of *Cryptosporidium spp* was 2.63% (2 out of 76) of examined samples and this result is lowered from previous studies in other provinces in Iraq and Iran (Zahra M. Al-Hakak, 2018; Azhar,2017; Razawi *et al.*, 2009; Hussin *et al.*, 2015).

Previous studies from Iraq are compatible with the results of the current study. Zahra *et al.*, (2018) studied the prevalence of gastrointestinal tract parasites in 180 camels, while the number of healthy she-camels was 149 (82.8%), they found that the number of infected camels was (31) by (17.2%) for both sexes, but the percentage of females was higher than that of males. This study also approved the significant statistical differences between males and females at ($p \leq 0.05$). The study also noticed a variation in gastrointestinal parasites according to age groups with the highest rate of infection in age (1 year - 3 years), while the lowest percentage (0.55%) occurred in camels in age (10 years - 12 years) and (13 years - 15 years). Zahra *et al.*, (2018) also detected the most common type of parasitic genera, including *Oesophagostomum venosum* (13%), *Oesophagostomum columbianum* (0.64%), *Trichuris globulosa* recorded by (3.2%), and *Entrobious spp.*. The current study results are also compatible with other previous studies done by Azhar, (2017) in Diwanyiah city/ Iraq in 2016. They detected the prevalence of intestinal parasites in camels by fecal examination. The results of this study have approved the presence of intestinal parasites (one or more species) with a percentage reach to 86.36%; *Fasciola spp* was maximum (31%), followed by *Eimeria spp* (26%), *Cryptosporidium spp* (17.89%), *Nematodirus spp* (7.36%), *Trichostrongylus spp* (6.31%), *Moneizia spp* (5.26%) and *Trichuris spp* (3.1%).

In Conclusion, the current study results approved the high percentage of incidence of gastrointestinal parasites in fecal samples collected from camels in Bediat Al- Samawa/ Al Muthanna province/ Iraq. The reported parasites are analogous to parasites fauna reported in other ruminants, expressing an essential challenge to animal farming. The authors recommend another future study to determine the relationship between the camelid's gastrointestinal parasites and parasites of other farm animals and to understand its epidemiology and their economic impacts on public health.

References

1. **Abdel-Rady A. (2014)** Epidemiological studies on parasitic infestations in camels (*Camelus dromedaries*) in Egypt. *Eur. J. Environ. Ecol.*, 1(1): 16-20.
2. **Abdul Al-Rahman Heidar Abdul Al-Hussein, Alaa Hussein Shanan, Karima A. Al-Salihi. (2020).** Prevalence of ticks infestation in dromedary



- camels (*Camelus dromedarius*) in area surrounded Sawa lake/ Iraq (2020). MRVSA. 9 (3): 24-36. [Doi: http://dx.doi.org/10.22428/mrvsa-2020-0093-02](http://dx.doi.org/10.22428/mrvsa-2020-0093-02)
3. **Ahmed ME, Hassan OA, Khalifa AKA, Elobied E, Osman AAA, Brair SL, Ahmed OIE, Elfadul MMA, Cremers AL and Grobusch MP. (2018).** Echinococcosis in Tambool, Central Sudan: A knowledge, attitude and practice (KAP) study. *Int. Health*, 10(6): 490-494.
 4. **Anwar AH and Khan MN. (1998).** Parasitic Fauna of Camel in Pakistan. Proceedings of the 3rd Annual Meeting for Animal Production Under Arid Conditions, United Arab Emirates. 69-76.
 5. **Al-Salihi KA, Abdullah S, Amjad L, Leitha H (2017).** Epidemiological study of clinical and subclinical mastitis in she- camel in Samawah desert / Al Muthanna governorate. MRVSA. 6(2): 11-24. <https://doi.org/10.22428/mrvsa.2307-8073.2016.00622.x>.
 6. **Al-Salihi Karima (2016).** Observations on dromedary (Arabian camel) and its diseases. MRVSA 5 (Special issue) 1st Iraqi colloquium on camel diseases and management. 1-11.
 7. **Al-Salihi Karima Akool (2012).** An insight into veterinary education in Iraq. *Veterinary Record* | September 29: 316-317.
 8. **Al-Salihi KA. (2018).** *Camelus dromedarius* Hydatidosis: study of prevalence in Al Muthanna governorate / Iraq. The 5th Conference of the International Society of Camelid Research and Development/ ISOCARD 2018. Institut Agronomique et Vétérinaire Hassan II, Rabat, Morocco Organize :The 5th Conference of ISOCARD “Recent advances in camelids biology, health and production”Palais des Congrès, Laâyoune, Morocco.
 9. **Azhar chaffat karawan. (2017).** Diagnostic study of internal parasites in camels of Al- diwaniya government. *Kufa Journal For Veterinary Medical Sciences* . Vol. (8) No. (1): 64-71.
 10. **Bekele T. (2002).** Epidemiological studies on gastrointes- tinal helminths of dromedary (*Camelus dromedarius*) in semi-arid lands of Eastern Ethiopia. *Vet. Parasitol.* 105(2): 139-152.
 11. **Bennoune O, Adili N, Amri K, Bennecib L and Ayachi A. (2013).** Trypanosomiasis of camels (*Camelus dromedarius*) in Algeria: First report. *Vet. Res. Forum.* 4(4): 273-275.
 12. **Borji H, Razmi G, Movassaghi AR, Naghibi A and Maleki M. (2009).** Prevalence of *Cryptosporidium* and *Eimeria* infections in dromedary (*Camelus dromedarius*) in abattoir, Iran. *J. Camel. Practice. Res.* 16(2): 167-170.
 13. Borji, H., Razmi, G., Movassaghi, A.R., Naghibi, A. and Maleki, M. (2010) A study on gastro-intestinal helminths of camels in Mashhad abattoir, Iran. *Iran. J. Vet. Res.* 11(2): 174-179.
 14. **Bouhous A, Aissi M. and Harhoura KH. (2008).** Study of *Ixodidae* in dromedaries in Southern Algeria, Adrar region (in French). *Ann. Méd. Vét.* 152(1): 52-58.
 15. Djerbouh A, Kernif T, Beneldjouzi A, Socolovschi C, Kechemir N, Parola P, Raoult D. and Bitam I. (2012). The first molecular detection of *Rickettsia aeschlimannii* in the ticks of camels from Southern Algeria. *Ticks. Tick. Borne. Dis.* 3(5-6): 374-375.



16. **Dubey JP and Schuster RK. (2018).** A review of coccidiosis in old world camels. *Vet. Parasitol.* 262: 75-83.
17. **Fowler E Murray. (2010).** *Medicine and surgery of Camelids.* Blackwell publishing. Third Edition.
18. **Hussin AG, Khalaf JM and Ali HM. (2015).** Detection of intestinal protozoa in camels and their breeders in Najef, Iraq. *Res. J. Vet. Pract.* 3(3): 53-57.
19. **Narnaware SD, Kumar S, Dahiya SS and Patil NV. (2017).** Concurrent infection of coccidiosis and haemonchosis in a dromedary camel calf from Rajasthan, India. *J. Camel. Practice. Res.* 24(3): 225-228.
20. **Oksanen A and Lavikainen A. (2015).** *Echinococcus canadensis* transmission in the North. *Vet Parasitol.* 213(3-4): 182-186.
21. **Radfar MH and Aminzadeh GM. (2013).** Common gastrointestinal parasites of indigenous camels (*Camelus dromedarius*) with traditional husbandry management (free ranging system) in central deserts of Iran. *J Parasit Dis.* 37(2): 225-230.
22. **Razawi SM, Oryan A, Bahrami S, Mohammadalipour A and Gowhari M. (2009).** Prevalence of *Cryptosporidium* infection in camels (*Camelus dromedarius*) in a slaughterhouse in Iran. *Trop. Biomed.* 26(3): 267-273.
23. **Saeed MA, Vaughan JL and Jabbar A. (2018).** An update on sarcocystosis in one-humped camels (*Camelus dromedarius*). *Parasitology.* 145(11): 1367-1377.
24. **Sazmand A and Joachim A. (2017).** Parasitic diseases of camels in Iran (1931-2017)-a literature review. *Parasite.* 24: 21.
25. **Talal Anwer Abdulkareem, Sajeda M Eidan, Faris F Ibrahim, Karima Akool Al Salihi, Oday Al-Abbadi, Mohamed Ghazi Abdulkareem, Qais Ameen Abdul-Rahman. (2020).** Analytical Study of The Reality of Camel Breeding in Iraq. Publisher: Publication Center for The University of Baghdad / ISBN: 978-9922-20-618-9.
26. **Zahra M. Al-Hakak (2018).** Study on the large intestinal worms in Iraqi camels and the extent of infection. *J Pharm Sci & Res.* 10(4):849-852.

