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Prevalence Rate of Intestinal Parasites in Camels in Riyadh, Saudi Arabia

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ABSTRACT

The prevalence of intestinal parasites in camels was studied in the Riyadh region, central Kingdom of Saudi Arabia. The study was carried out over a population of 240 animals which examined their feces by coprological methods. Out of 240 samples of feces examined, 143 cases (59.6%) were positive for intestinal parasites of whom 82 were male (34.2%) and 61 were female (25.4%). There was a significant difference between male and female ($p<0.05$). The infection rates in different age groups (Calves<1 year, 1-2 year old and adult) were 9.6, 15.8 and 34.2%, respectively. The single infection (29.2%) was the highest and concurrent infections were with two (18.3%) and three or more (12.1%). Intestinal parasites which detected in camels feces were belong to nematoda: *Trichostrongylus* spp. (15.4%), *Haemonchus* spp. (10.4%), *Trichuris* spp. (8.8%), *Nematodirus* spp. (5%), *Osrtertagia* spp. (2.9%) and cestoda: *Moniezia expansa* (6.7%), *Stilesia* spp. (3.3%) coccidia: *Eimeria cameli* (7.1%). The high prevalence of intestinal parasites among camels reported during summer season.

Key words: Prevalence, intestinal parasites, camel, Riyadh, Saudi Arabia

INTRODUCTION

Camel is an ancient animal well known in the history of human civilization. It belongs to the class Mammalia the order Artiodactyla; sub-order Tylopoda and family Camelidae (Al Haj and Al Kanhal, 2010). Camels are important multipurpose animals of arid and semi-arid parts of the world, especially in Saudi Arabia. Camels are the most main livestock that can live and produce in needy farms and can be compared with high-yield animals of the same weight such as cattle, in productivity under manual feeding. Consequently, there is a necessity to improve management of camels considering its possibility in the semiarid and arid regions where livestock production is becoming more difficult due to climate changes (Sazmand, 2011). In Saudi Arabia camels are the major domestic animal. Moreover, camels are considered to be a good source of milk and meat to nomadic and cities habitat and are used for other purposes such as transportation and sport racing. It has been domesticated for transportation, meat, clothing and milk over 4000 years ago (Wilson, 1984). There are two known species of camels, namely; *Camelus bactrianus* (the two humped camels), *Camelus dromedarius* (the one humped camel) which is also called the trade camel or Arabian camels (Dorman, 1986). Intestinal parasites, both protozoa and helminths are one of the major causes of impaired milk and production, as well as impaired fertility and low calving rates of camels. Parasitic diseases may lower the working efficiency or result in death and sometimes serve as a potential danger for public health (Anwar and Khan, 1998).

The present study was designed to provide preliminary information on the prevalence rates and type of camel intestinal parasites in Riyadh, the center of the Saudi Arabia.

MATERIALS AND METHODS

Study field: The Riyadh region is located in the central region of Arabian peninsula. A thousand of camels are distributed in many farms in the different area (West, East, South, North) Riyadh region Kingdom of Saudi Arabia.

Sampling procedure: The samples were collected between the period of July 2013 and June 2014. The total of 240 feces camels, 152 were adult (70 males, 82 females), 55 were 1-2 year old animals (34 males, 21 females) and 33 were calves <1 year (18 males, 15 females). The animals were divided into three groups, namely young camel calves (less than one year old), immature (one to two years old), adult (more than three years old). For each animal, area, age and sex were recorded. In each farm, fecal sample was collected directly from the rectum using sterile plastic gloves. The samples were transported to the laboratory in a cool box and then stored for a maximum of 24 h before analysis.

Two hundred and forty of fecal samples were examined in the study. Each sample was numbered and subjected to a clinical examination. The collected fecal samples of each animal were examined by direct smear techniques, a simple flotation method using sodium chloride solution and centrifugal sedimentation technique. Each sample was examination under a light microscope (X10-X40) for parasites stages (cysts, oocysts, eggs or larvae) and the parasites stages were identified based on morphological characters as described by Soulsby (1982) and Kaufmann (1996).

Statistical analysis: Statistical evaluation was undertaken to compare the prevalence among different age groups, gender, area and season with confidence interval of 95% using non-parametric Chi-square. Probability value of less than 0.05 was regarded statistically significant.

RESULTS

The present study showed that, out of 240 camels examined by researcher, about 143 cases (59.6%) were positive for intestinal parasites, of whom 82 were male (34.2%) and 61 were female (25.4%). There was no significant difference between male and female camels in parasitic infection ($p>0.05$). The infection rates in different age groups (Calves<1 year, 1-2 year old and adult) were 9.6, 15.8 and 34.2, respectively (Table 1). The single infections parasites was the highest 70/143 (29.2%) and the multipliable infections was the lowest 29/143 (12.1%) as shown in Table 2. Table 3 illustrated the prevalence of intestinal parasites in camels. However, nematoda was the highest parasitic infection among camels 102/240 (42.5%). Moreover, five helminths of different types of nematoda were identified (*Trichostrongylus* spp., *Haemonchus* spp., *Trichuris* spp.,

Table 1: Detection of intestinal parasites among camels in both sexes and ages

				Total of positive			
				---			Statistical
Gender	Calves <1 year	1-2 year old	Adult	No.	%	Total numbers	analysis
Male	13	23	46	82	34.2	122	$\chi^2 = 5.99$
Female	10	15	36	61	25.4	118	$p>0.05$
Total of positive	23 (9.6%)	38 (15.8%)	82 (34.2%)	143	59.6	240	
Total numbers	33	55	152				
Statistical analysis							
$\chi^2 = 5.39$							
$p>0.05$							

Table 2: Multiplicity infection with intestinal parasites among camels in both sexes and ages

	Infections		Group of age			Sex	
Parameters	No.	%	Calves <1 year	1-2 year old	Adult	Male	Female
Single	70	29.2	18	16	36	38	32
Double	44	18.3	5	12	27	26	18
Multiple	29	12.1	0	10	19	18	11
Total	143	59.6	23	38	82	82	61
Statistical analysis						$\chi^2 = 0.569$	
$\chi^2 = 11.25$						p>0.001	
*p<0.05							

*Significant difference

Table 3: Prevalence of intestinal parasites in camels in Riyadh

	Infection	
Intestinal parasites	No.	%
Nematoda	102	42.5
Trichostrongylus spp.	37	15.4
Haemonchus spp.	25	10.4
Trichuris spp.	21	8.8
Nematodirus spp.	12	5.0
Osrtertagia spp.	7	2.9
Cestoda	24	10.0
Moniezia expansa	16	6.7
Stilesia spp.	8	3.3
Protozoa	17	7.1
Eimeria cameli	17	7.1
Total	143	59.6

Table 4: Regions of Prevalence of intestinal parasites among camels in Riyadh

	Infection		
Region	No.	%	Total
North	27	45.0	60
South	38	63.3	60
West	31	72.1	43
East	47	61.04	77
Total	143	59.6	240
Statistical analysis			
$\chi^2 = 8.56$			
*p<0.05			

*Significant difference

Nematodirus spp. and *Osrtertagia* spp.) and two species of cestoda (*Moniezia expansa*, *Stilesia* spp.). The highest prevalence among all other species of intestinal parasites was found to be *Trichostrongylus* spp. 37/240 (15.4%) and the lowest frequent parasites was found to be *Stilesia* spp. 8/240 (3.3%). Protozoa was found to be 17/240 (7.1%). The prevalence of intestinal parasites among camels in different regions in Riyadh as shown in Table 4 was highest in west 31 (72.1%). The highest infection rate was in summer 55 (68.8%) during the year (Table 5).

Table 5: Seasonal prevalence of intestinal parasites among camels in Riyadh

	Infection		
Season	No.	%	Total
Summer	55	68.8	80
Autumn	38	61.3	62
Winter	19	48.7	39
Spring	31	52.5	59
Total	143	59.6	240
Statistical analysis			
$\chi^2 = 5.92$			
$p>0.05$			

*Significant difference

DISCUSSION

The present study illustrated the prevalence of intestinal parasites among camels in the Riyadh region by examined samples of 240 camels feces, more than half (59.6%) were infected with intestinal parasites, this result incongruent as compared with the results that reported in Jordan who found the prevalence was 98% in 2000 (Moustafa *et al*., 2003). Moreover, the percentage in Nigeria was (87.3%) in 2012 and in Iran (81.3%) in (2013) (Ukashatu *et al*., 2012; Anvari-Tafti *et al*., 2013). On the other hand, it was slightly high as compared with the study that reported by Alhendi (2000) in Saudi Arabia where the prevalence was (38%).

Present results in this study were nearly to those obtained by Mahfooz *et al*. (2006) in Pakistan (2006) (60%), Swai *et al*. (2011) in Tanzania (62.7%) and Radfar and Gowhari (2013), in Iran (64%). However, decline in incidence may be due to the extremely high temperature and drought. According to Banaja and Ghandour (1994), gastrointestinal parasitic infection is considered as one of the major problems in camels in Saudi Arabia. The differences between the results of these studies might be due to differences in the technical examination, climatic condition of the areas, the age of camels and species.

The detection of intestinal parasites among male and female camels were 82/240 (34.2%), 61/240 (25.4%), respectively, there were no significant differences between them ($p>0.05$) which was in agreement with Radfar and Gowhari (2013), Anwar and Khan (1998), Ukashatu *et al*. (2012) and Radfar *et al*. (2006). In addition, concerning the infection rate among different age groups, it was found that no significant differences ($p>0.05$). However, the rate of multi infection with intestinal parasites in camels was nearly similar to that are recorded by Swai *et al*. (2011). There was a significant differences between multi infection and age group ($p<0.05$). On the other hand, there was no significant differences with both sex of camels ($p>0.001$). Moreover, the parasites eggs that detected in camels feces were belonging to nematode: *Trichostrongylus* spp. (15.4%), *Haemonchus* spp. (10.4%), *Trichuris* spp. (8.8%), *Nematodirus* spp. (5%), *Osrtertagia* spp. (2.9%) and Cestoda: *Moniezia expansa* (6.7%), *Stilesia* spp. (3.3%). These helminths which are detected in this study was in agreement with El-Bihari and Kawasmeh (1980), Dakkak and Ouhelli (1987), Abdul-Salam and Farah (1988), Banaja and Ghandour (1994), Anwar and Khan (1998), Abdel Rahman *et al*. (2001), Mahfooz *et al*. (2006), Radfar *et al*. (2006), Borji *et al*. (2010), Ukashatu *et al*. (2012), Anvari-Tafti *et al*. (2013) and Radfar and Gowhari (2013).

The highest prevalence rate for Nematoda in camels in this study in agreement with most studies which found the highest infection in camels was nematode in Saudi Arabia (El-Bihari and

Kawasmeh, 1980), in Kuwait (Abdul-Salam and Farah, 1988) in Pakistan (Mahfooz *et al*., 2006) in Iran (Radfar *et al*., 2006; Borji *et al*., 2010; Anvari-Tafti *et al*., 2013; Radfar and Gowhari, 2013) in Tanzania (Swai *et al*., 2011).

In addition, the highest prevalence of *Trichostrongylus* spp. it was in contract with El-Bihari and Kawasmeh (1980), Abdul-Salam and Farah (1988), Ghandour *et al*. (1998), Borji *et al*. (2010) and Anvari-Tafti *et al*. (2013). *Eimeria cameli* is considered one of pathogenic species in camels. This species has wide spread in the different countries. It was recorded by Anwar and Khan (1998) in Pakistan, Radfar and Gowhari (2013) in Iran.

The regional distribution of infection in camels was reported with a higher percentage in the west of Riyadh region (72.1%), as compared with the South, East and North (63.3%, 61.04% and 45%, respectively) ($p<0.05$). This indicates that, there is a significant difference may be due to arise large number of different animals in this region.

The high prevalence of intestinal parasites among camels reported in this study, was during the summer (June to August). The present findings were in harmony with Abdul-Salam and Farah (1988), who reported that, the highest worm and egg counts were found during the hot dry season (June and August).

In addition, similar findings of worm burdens known to be high during this period were reported by Nwosu *et al*. (2007), Mohammed *et al*. (2007) and Ukashatu *et al*. (2012), followed by autumn, spring, winter, respectively. However, no significant difference was found between the proportions of infected dromedaries in different seasons in these areas ($p>0.05$).

CONCLUSION

Most of the previous studies in different countries revealed that a major problem of the camels is that infected with different parasites and parasitosis. This study clarified that camels are infected with an incidence of parasites in Saudi Arabia, Consequently, camels play an important role in maintaining and transmitting parasites diseases in dry regions of Kingdom of Saudi Arabia.

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