

Parasites Detected by Examination of Fecal Samples in Wrestling Camels

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Summary

First historical findings on camel wrestling, which is now practiced as a festival in Turkey, particularly in certain regions (Marmara, Aegean, Mediterranean) date back to the 15th century. In terms of animal husbandry, parasitic diseases may result in negative outcomes ranging from loss of performance to death for camels. In the present study, annual camel wrestling arenas were visited between December and March (2010-2011), and stool samples were collected from camels from different cities for parasitological analysis. Stool samples of 109 camels from 7 different cities (Aydin, Izmir, Manisa, Denizli, Mugla, Balikesir, and Canakkale) were examined using Baermann-Wetzel stool culture, flotation, and sedimentation techniques for the parasites that live in gastrointestinal tract. The analyses revealed that 74% of the camels (81 of 109) were infected with one or more parasites: *Trichostrongylus* spp. (47.7%), *Ostertagia* spp. (27.5%), *Dicrocoelium* spp. (24.7%), *Trichuris* spp. (11.9%), *Eimeria cameli* (11.9%), *Capillaria* spp. (6.4%), *Fasciola* spp. (6.4%), *Dictyocaulus viviparus* (5.5%), *Haemonchus* spp. (4.5%), *Oesophagostomum* spp. (4.5%), *Cooperia* spp. (4.5%), *Cooperia oncophora* (3.6%), *Nematodirus* spp. (3.6%), *Chabertia ovina* (2.7%), *Eimeria* spp. (1.8%), and *Paramphistomum* spp. (0.9%). 16 different parasites, at the level of species and genus, were found, of which 14 were helminth (11 nematodes, 3 trematodes), and 2 were protozoans. The present study was the first to report *Ostertagia* spp., *Fasciola* spp., *Dictyocaulus viviparus*, *Haemonchus* spp., *Oesophagostomum* spp., *Cooperia* spp., *Cooperia oncophora*, *Chabertia ovina* and *Paramphistomum* spp. in camels in Turkey. As high as 74 percent of the incidence of parasitic diseases and the wide variety of parasites found in the present study suggest that parasitic infections may be overlooked entity in wrestling camels that are meticulously brought up.

Keywords: Camel, Helminth, Protozoon, Turkey

Güreş Develerinde Dışkı Bakılarına Göre Saptanan Parazitler

Özet

Deve güreşlerinin tarihine ilişkin ilk bulgular 15. yüzyıla ait olup, günümüzde Türkiye'nin özellikle belli bölgelerinde (Marmara, Ege ve Akdeniz Bölgeleri) festival havasında yapılan etkinlikler şeklindedir. Yetiştirilme hedefleri doğrultusunda parazitler hastalıklar, bu hayvanlarda performans kayıplarından başlayıp ölüme kadar gidebilen değişik derecelerde olumsuzluklara neden olabilmektedir. Bu çalışmada Aralık-Mart ayları arasındaki dönemlerde her yıl düzenlenen deve güreşi alanlarına gidilmiş (2010-2011), değişik illerden gelen develerden dışkı örnekleri alınmış ve parazitolojik açıdan incelenmiştir. 7 ayrı ilden (Aydın, İzmir, Manisa, Denizli, Muğla, Balıkesir, Çanakkale) gelen toplam 109 hayvandan alınan dışkı örnekleri Baerman Wetzel, dışkı kültürü, flotasyon ve sedimentasyon metotları uygulanarak sindirim sistemi ve ilişkili organlarda bulunan parazitler açısından muayeneleri yapılmıştır. Yapılan incelemelerde develerin %74'ü (81/109) bir ya da daha fazla parazitte enfekte bulunmuş olup; *Trichostrongylus* spp. %47.7, *Ostertagia* spp. %27.5, *Dicrocoelium* spp. %24.7, *Trichuris* spp. %11.9, *Eimeria cameli* %11.9, *Capillaria* spp. %6.4, *Fasciola* spp. %6.4, *Dictyocaulus viviparus* %5.5, *Haemonchus* spp. %4.5, *Oesophagostomum* spp. %4.5, *Cooperia* spp. %4.5, *Cooperia oncophora* %3.6, *Nematodirus* spp. %3.6, *Chabertia ovina* %2.7, *Eimeria* spp. %1.8, *Paramphistomum* spp. %0.9 oranlarında tespit edilmiştir. Tür ya da cins düzeyinde 16 farklı parazit varlığı tespit edilmiş olup bunlardan 14'ü helmint (11 nematod, 3 trematod) 2'si protozoondur. Bu çalışmayla develerde *Ostertagia* spp., *Fasciola* spp., *Dictyocaulus viviparus*, *Haemonchus* spp., *Oesophagostomum* spp., *Cooperia* spp., *Cooperia oncophora*, *Chabertia ovina* ve *Paramphistomum* spp. Türkiye'den ilk kez bildirilmiştir. Bu sonuçlara göre %74'lük enfeksiyon oranı ve parazit çeşitliliği, yetiştiriciliği özenle yapılan güreş develerinde parazitler enfeksiyonların göz ardı edildiğini düşündürmektedir.

Anahtar sözcükler: Deve, Helmint, Protozoon, Türkiye



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INTRODUCTION

The fact that these outdoor games previously held by cameleers among themselves as challenging winter entertainment have been adopted by the people has led to the development of camel wrestlings¹. First historical findings on camel wrestling, which are now held in the form of festival activities in Turkey, particularly in certain regions (Marmara, and Akdeniz Regions), date back to the 15th century². In many countries, camels are utilized for carrying people or goods, and for their meat. However, camels that are bred in our country are primarily used in camel wrestling, and utilized for their meat when necessary, as well (especially in the production of sujuk, a spicy sausage).

Wrestling camels are hybrids of female Dromedary (Arabian) camels (*Camelus dromedaries*) and male Bactrian (Asian) camels (*Camelus bactrianus*). The hybrid male camels, which are bigger and heftier than their parents, are better at carrying loads and speed². In regards to the upbringing goals, parasitic diseases may have negative effects in degrees varying from loss of performance to death cases on camels.

Camel wrestling and cameleering have an important position in local cultures in certain regions of Turkey (Ege, Marmara, and Akdeniz Regions), and attract an increasing attention, but few scientific studies on the diseases of this animal group utilized for various purposes for centuries are available both in Turkey and in the world. Therefore, the current study was aimed at determining the parasitic variety in these animals by identifying eggs, larvae, and oocytes that might lead to the growth of parasites found in stool.

MATERIAL and METHODS

Camels and the Collection of Stool Samples

For convenience in gathering materials, stool samples were collected from the camels in the wrestling arenas in the months of December, January, February, and March (2010-2011), which are estrous period of the camels, and which also correspond to the wrestling months. Stool samples were collected from camels from different cities taking part in the events, primarily in the city of Aydın and those in its vicinity, and İzmir and Muğla. Since the camels were dangerous and the procedure were considered by the owners so delicate, stool samples were collected fresh from the ground where camels were standing apart from each other, instead of collecting them directly from the rectums of the animals, taking extra caution and making sure that the samples were clean. It was also made sure that the camels from which the stool samples were collected did not receive any anthelmintic drugs within the last six months. The stool samples collected from 109 animals (all from males between the ages of 7 and 18) from 7 different cities (Aydın, 54; Muğla, 21; İzmir, 16; Denizli, 5; Canakkale, 5; Manisa, 4; Balıkesir, 4), whose data were recorded and

enclosed individually (age, sex, city, and contact information of owner), were transported to the laboratory in big containers.

Examination of Stool Samples

Stool samples from each camel were individually separated into three parts. The Baermann-Wetzel technique was immediately employed for the first part to investigate the presence of lungworms³.

The second part of stool samples were separately cultivated to identify at the level of genus or species gastrointestinal nematodes, known as *Trichostrongylidae*. Stool samples were blended with fine tree sawdust and water to form a slurry (3 parts stool, 1 part sawdust), then placed in plastic containers and incubated in an incubator at 26-28°C for one week. During the incubation period, stool samples were taken out of the incubator, stirred for aeration, and water was added to the containers with lower amounts of water^{3,4}. The larvae developed at the end of the period were collected using the Baermann-Wetzel technique, and morphologically identified in accordance with the relevant literature^{5,6}.

Third-part stool samples were analyzed using Fülleborn's saturated saltwater flotation and Benedek's sedimentation techniques^{3,4}.

RESULTS

Co-evaluation of findings from lungworm analyses, egg and oocyte determination analyses, and cultivation results revealed that 74% of the camels (81 out of 109) were infected with one or more parasites.

Sixteen different parasites were determined at the level of genus or species, of which 14 were helminth (11 nematodes, 3 trematodes) and 2 were protozoans (*Table 1*). The most common parasite among all was *Trichostrongylus* spp. by 47.7%, followed by *Dicrocoelium* spp. among trematodes by 24.7%, and *Eimeria cameli* among protozoans by 11.9%. The least detected parasite was *Paramphistomum* spp. with a rate of 0.9%, being identified in only one animal.

DISCUSSION

In studies on camel diseases, it has been observed that parasitic infections are the major cause of reduced nutrient utilization, as well as decreased meat and milk yield, reduced growth rate in youngsters, and reproductive deficiency^{7,8}. In Sudan, which has the second largest camel population in the world, the most common diseases in camels are associated with parasitism⁹. Much of the information on the gastrointestinal helminthes of camels was obtained from those studies conducted in Northern African countries. These studies have reported that camels

Table. Identified parasites and diffusion rates in camels whose stools were inspected**Tablo.** Dışkı bakısı yapılan develerde, bulunan parazitler ve yayılış oranları

Species of Parasite	General Situation		Aydın	Muğla	İzmir	Denizli	Çanakkale	Manisa	Balıkesir
	NIA (n=109)	PIA (%)	NIA (n=54)	NIA (n=21)	NIA (n=16)	NIA (n=5)	NIA (n=5)	NIA (n=4)	NIA (n=4)
<i>Trichostrongylus</i> spp.	52	47.7	33	6	7	4	1	1	-
<i>Ostertagia</i> spp.	30	27.5	16	7	3	4	-	-	-
<i>Trichuris</i> spp.	23	11.9	9	6	4	-	2	-	-
<i>Capillaria</i> spp.	10	6.4	2	4	2	1	-	-	1
<i>Dictyocaulus viviparus</i>	6	5.5					-	-	-
<i>Haemonchus</i> spp.	5	4.5	4	1	-	-	-	-	-
<i>Oesophagostomum</i> spp.	5	4.5	5	-	1	-	-	-	-
<i>Cooperia</i> spp.	5	4.5	2	1	-	1	1	-	-
<i>Cooperia oncophora</i>	4	3.6	3	1	-	-	-	-	-
<i>Nematodirus</i> spp.	4	3.6	3	-	-	1	-	-	-
<i>Chabertia ovina</i>	3	2.7	2	-	-	-	1	-	-
<i>Dicrocoelium</i> spp.	27	24.7	15	2	5	2	-	2	-
<i>Fasciola</i> spp.	7	6.4	3	-	1	-	-	-	-
<i>Paramphistomum</i> spp	1	0.9	-	-	1	-	-	-	-
<i>Eimeria cameli</i>	13	11.9	10	2	2	-	-	-	-
<i>Eimeria</i> spp.	2	1.8	-	-	-	1	-	-	-

NIA: Number of infected animal, PIA: Percentage of infected animals

are susceptible to more than 60 types of helminthes. It should be surprising that little is known about the endoparasites in camels that in the Arabian Peninsula, are the most important source of meat and milk for the nomads, as well as used as means of transportation ⁷.

There are few helminthological studies on camels in Turkey ^{10,11}. Merdivenci ¹² and Turkutanit ¹³ have come across *Dipetalonoma evansi* in the testicular connective tissue and testicular (spermatic) arteries of camels. In a study by Eren *et al.* ¹⁴ on the analyses of stool samples from 150 camels, *Trichostrongylidae* eggs (26%), *Nematodirus* spp. eggs (12%), *Trichuris* spp. eggs (10%), *Dicrocoelium* spp. eggs (7%), and *Eimeria* spp. oocytes (4.6%) were identified. In the same study, six cases of "hydatid cysts" were identified in organ examinations of 6 camels that were cut in the slaughterhouse, 2 of which had hydatid cysts both in their lungs and liver. Despite similarities with the current study, in the above-mentioned study ¹⁴, helminths were identified by only morphologically identifying larvae in the stool samples, and because cultivation was not performed, parasite identifications were only at family or genus levels. In the current study, *Trichostrongylidae*, which can affect yield characteristics, were identified at genus and species levels. The latest Turkish study we were able to obtain was the study by Cirak *et al.* ¹⁵ on the efficacy of Doramectin conducted with a total of 10 camels. Cirak *et al.* ¹⁵ have reported the presence of *Trichostrongylus* spp.,

Teladorsagia spp., *Nematodirus* spp., *Trichuris* spp., *Capillaria* spp., Anoplocephalidae, *Dicrocoelium dendriticum*, *Eimeria cameli* and *E. rajasthani*, with *Trichostrongylus* spp. being the most common species, as in the present study.

While no *Dictyocaulus filaria*, the most common nematode found in the lungs of those in Africa and Asia ^{10,16}, were detected in the current study, the less frequently seen, *D. viviparus*, was detected by 5.5%, which is thought to be due to the fact that camels share the meadows with other animals in their specific geographic locations, certainly affecting the diversity of other parasites found in camels. Lungworms that cause symptoms associated with the respiratory system, as well as general depression and rapid loss of fitness are particularly important in camels from which performance is expected ¹⁷.

The most common coccidiosis factor in camels, *Eimeria cameli* ¹⁶⁻¹⁹, was detected by 11.9% in the current study. Although the animals in the current study were between the ages of 7 and 18 and coccidiosis would not be expected to occur, it is especially crucial for animal owners to take necessary precautions considering the fact that infected animals are carriers for young camels.

This study was the first to report *Ostertagia* spp., *Fasciola* spp. *Dictyocaulus viviparus*, *Haemonchus* spp., *Oesophagostomum* spp., *Cooperia* spp., *Cooperia oncophora*,

Chabertia ovina and *Paramphistomum* spp., in camels in Turkey. Camels, like cattle or sheep, have a broad spectrum of helminths. The fact that the present study has found the incidence of the infection as high as 74% and the wide variety of parasites suggest that parasitic infections may be overlooked factor among wrestling camels that are meticulously brought up. We hope that the results of the present study will raise awareness among camel owners and veterinarians of the risk factors of the parasitic diseases that progress without symptoms.

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