

Dept. of Parasitology,  
Fac. Vet. Med., Munich University,  
Head of Dept.

**COMPARATIVE STUDIES ON COPROLOGIC  
RESULTS OF CARNIVOROUS ANIMALS  
IN ZOOLOGICAL GARDENS OF GIZA  
EGYPT AND MUNICH GERMANY**  
(With 6 Tables)

By

**M.A. HASSLINGER; THORAYA M. EL-ASSALY\* and M.K. SELIM\*\***  
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دراسات مقارنة عن الطفيليات الداخلية في الحيوانات آكلة  
اللحوم بحديقتي حيوانات الجيزة بمصر وميونخ بألمانيا

م.أ. هاسلينجر ، ثريا العسلي ، كمال سليم

تم إجراء البحث علي ٦٦ من الحيوانات آكلة اللحوم في حديقة حيوانات الجيزة ( ثعلب بري ، ٤ ، ابن أوي ، ٢ ثعلب حقلي ، ٢ جبلي ، ١ قطة برية ، ٢ قطة سيامية ، ١ أوز بري ، ١ ضبع مخطط ، ٢ ضبع غير مخطط ، ٢ أسد جبلي ، ٢ ببر منقط ، ١٢ أسد حقلي ، ٨ نمر ، ٢ ببر غير مخطط ، ٢ ببر أسود ، ٦ قطة كلتشي ، ١٢ كلب ، وشمل العمل فحص لعينات البراز المأخوذة من هذه الحيوانات وإتضح من الفحص أن ٤٥% من هذه الحيوانات مصابة بالطفيليات الداخلية وكانت غالبية الإصابات ببديدان الإسكارس وقد تم إجراء دراسات مقارنة علي حيوانات حديقة حيوانات ميونخ بألمانيا ( ٢ قطة برية ، ٢ كلب بري ، ٢ أسد حقلي ، ١ أسد جبلي ، ٢ ببر صيني ، ٢ كلاب صيد ، ٢ ببر عادي ، ٢ ببر بتساوي ، ٢ نمر سيبيري ، ٢ نمر سيمازي ، ٢ نمر أسود ، ٢ قطة أزولوطي ، ٢ قط أفريقي ، ٢ قط لوكزي ، ١ قط سوميكاتي ) وقد إتضح من فحص عينات البراز لهذه الحيوانات أن ٢٢.٢% من هذه الحيوانات مصابة بالطفيليات الداخلية وأغلبية الإصابات كانت ببديدان الإسكارس .

**SUMMARY**

A total of 66 carnivorous animals (one fox, four jackals, two fenne foxes, one sand fox, one wild cat, three siam cats, one mongoos, one striped hyaena, three hyaenas, two pumas, two spotted leopards, twelve lions, eight tigers, two leopards, three black leopards, six cheetches and fourteen dogs) kept in Giza Zoological gardens were coprologically examined for endoparasites with infection rate of 54.5%. The most prevalent parasites were ascarid nematodes. A total of 36 carnivorous animals (Three wild cats, two wild dogs, two lions, one puma, four chinese leopards, three gepards, four leopards, three pess leopards, three sibesien tigers, two simatsa tigers, two-black panthers, two-ozelots, two servals, two lyxse

\* : Dept. of Parasitology, Animal Health Research Institute.

\*\* : Dept. of Parasitology, Fac. Vet. Cairo University.

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and one Sumicata tetralachyta were kept in Munich Zoological gardens. The results of their coprological examination revealed 22.2% infection rate with endoparasites. The most prevalent endoparasites were ascarid nematodes.

### INTRODUCTION

The importance of Zoo animals has attracted the attention of many workers all over the world, who studied their behaviour and diseases under captive condition. In Egypt, much attention was paid to the parasites especially the endoparasites of carnivorous animals due to the easy infection with infective stages. Hence, the present study is carried out to investigate the prevalence of such parasites and compare the results of faecal examination of carnivorous animals in Giza and Munich Zoological gardens.

In 1988, OMAR and FAHMY reported on the coprological examination results of gastro-intestinal parasites of Giza Zoological gardens among which carnivorous animals were included. Since that time, no further work has been carried.

In 1965, TETZEL, in his thesis mentioned the results of examination of animals in Zoological gardens of Munich and noticed some variations in the prevalence of parasites during the different months of the year 1961-1962.

Also, BARUTZKI *et al.* (1985) mentioned the prevalence of endoparasites in Zoo animals of Munich gardens. Therefore, the present study is carried out to compare the results of previous workers both in Giza and Munich Zoological gardens with those carried out in both gardens later on.

### MATERIAL and METHODS

Faecal samples of carnivorous animals from Giza Zoological gardens, Egypt were collected during March and April (1987). The faecal samples were freshly collected and examined by floatation technique (SOLUSBY, 1982). The samples were examined in laboratory department of Giza Zoological garden. The animals investigated were 66 in number including dogs, jackal, fenne fox, sand fox, wild cat, siamese, mongoos, striped hyaena, hyaena, puma, spotted leopard, lion, tiger, leopard, black leopard and cheetch.

Faecal samples of carnivorous animals from Munich Zoological garden, Germany were also collected during July and August (1991). They were examined in Parasitology Department of Tropen Institut, Munich University. The samples were including wild cat, wild dog, lion, puma, Quina leopard, Gepord, Leopard, Pess leopard, Sibesian tiger, Simatsa Tiger, black panther, Ozelot, Felis serval, lyxse and Sumicata tetralachyta.

## RESULTS

Coprologic examination of samples from carnivorous animals of Giza revealed that 36 out of 66 samples of carnivorous animals (54.5%) were infected with different gastrointestinal parasites. Ancylostoma, Toxocara, Toxascaris and Isospora were detected 1.5%, 9.1%, 40.9% and 7.6% respectively (Table 1). 9 dogs out of 14 (64.3%) were infected with Toxocara, Toxascaris and Isospora were detected 35.7%, 28.6%, 7.1% respectively (Table 2).

Table (3) illustrates the faecal examination of 52 of different carnivorous animals and revealed the presence of 27 infected with endoparasites (51.9%). The floatation method revealed infection with Ancylostoma caninum eggs, Toxocara eggs, Toxascaris eggs and Isospora oocysts. Moreover, fox demonstrated Ancylostoma caninum eggs in his faeces. Four Jackals were negative to endoparasites. One out of 2 fenne foxes was infect with Toxocara. The sand fox was infected with Toxascaris eggs. A wild cat was infected with Toxascaris eggs and Isospora oocysts. Three siam cats were infected with Toxascaris eggs and two of them showed infection with Isospora oocysts. The mongoos as well as the striped hyaena, the 3 hyaena and the 2 leopards were free of endoparasites. Toxascaris eggs were detected in one of the two puma (50%), the two spotted leopard (100%), 11 out of 12 lions (91.6%), 3 out of 8 tigers (37.5%) as well as 2 out of 6 cheetch (33.3%). A black leopard out of 3 had Isospora oocysts in his faeces (33.3%).

Coprologic examination of samples from carnivores of Munich revealed that 8 out of 36 samples (22.2%) were infected with different gastrointestinal parasites (Table 4). Three wild cats, two wild dogs, two lions, a puma, three pess leopards, three sibosian-tigers, two simatsa tigers, two black panthers, two ozelots, two felis serval were negative to endoparasites.

Isospora sp. oocysts were detected in a chinese leopard out of four (25%), and in the Sumicata telralachyta.

Toxascaris eggs were found in three gepords (hunting leopards) (100%), in one out of 4 leopards (25%), the two lyxes were both infected with Toxascaris and one of them had both Toxocara and Toxascaris eggs.

## DISCUSSION

Results obtained through examination of samples from animals in Giza Zoological garden revealed a high rate of infection with enteric parasites which reached to (51.9%) while those in Munich had lesser infection rate being (22.2%).

In Giza and Munich Zoological gardens Toxascaris infection was more prevalent than Toxocara. Toxascaris eggs were met with in 23 animals out of 52 (44.23%) in Giza. These results agreed with those of OMAR and FAHMY (1988) as shown in (Table 5), while in Munich, among 6 (16.7%) out of 36 animals. This result agreed with BARUTZKI et al. (1985) who reported that Toxascaris was more prevalent than Toxocara in

felines (Table 6).

Also KLOSS and LANG (1982) recorded that felines in Zoo were infected with Toxocara and Toxascaris. They also reported that the most prevalent parasites of canines in Zoological gardens were ascarids.

In Giza Zoological garden 4 out of 14 dogs had Toxascaris eggs (28.6%) while Toxocara eggs were found in 5(35.7%) dogs. Probably the age of animals played a role in such infection with Toxocara where the infected animals were commonly young animals and reinfection with Toxocara could occur but the worm do not reach maturity.

Infection with Ancylostoma sp. was met with in a fox in Giza Zoological gardens but not in other animals in Giza and Munich. The infected fox, probably had carried out such infection when it was introduced to Giza Zoological gardens. Such results attract the attention of examining the animals on regular intervals, at least one medicament is needed just on introduction into the Zoo.

Isospora was met with in 2(5.6%) of animals in Munich and 5(7.6%) in Giza Zoological garden. These results were lower than those reported by BARUTZKI et al. (1985) who mentioned that felines (Felidae) infected by coccidia in a rate of 13.9% as shown in table (6). Probably, such infected animals did not show any symptoms and the number of produced oocysts are small, hence the infection is prolonged.

From this comparative studies, it is concluded that special attention should be paid for the animals (old and newly introduced) of Giza Zoological gardens as well as periodical examination and treatment of the infected animals. Also especial attention should be occurred for their food which must be parasitic free.

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## COPROLOGY, CARNIVORA, IN ZOOLOGICAL GARDENS

Table (1): Results of coprological examination of 66 carnivorous animals in Giza Zoological gardens during March (1987) to April (1987)

	No. inf. animals	<u>Ancylostoma</u>	<u>Toxocara</u>	<u>Toxascaris</u>	<u>Isospora</u>
Total	36	1	6	27	5
Inf. Rate	54.5%	1.5 %	9.1 %	40.9 %	7.6 %

Table (2): Giza Zoological Garden Results of faecal examination of dogs in (1987)

No.	Positive	<u>Toxocara</u>	<u>Toxascaris</u>	<u>Isospora</u>
1	+	+	-	-
2	+	+	-	-
3	+	+	-	-
4	-	-	-	-
5	+	+	-	-
6	-	-	-	-
7	+	+	+	-
8	+	-	-	+
9	+	-	+	-
10	+	-	+	-
11	+	-	+	-
12	-	-	-	-
13	-	-	-	-
14	-	-	-	-
Total	9	5	4	1
%	64.3 %	35.7 %	28.6 %	7.1 %

Table (3): Giza Zoological Garden Results of faecal examination of carnivorous animals in (1987)

Species	No. of Animals	No. of infec.	<u>Ancylo-</u> <u>stoma</u>	<u>Toxo-</u> <u>cara</u>	<u>Toxa-</u> <u>scaris</u>	<u>Iso-</u> <u>spora</u>	%
Fox	1	1	+	-	-	-	100%
Jackal	4	0	-	-	-	-	0
Fenne fox	2	1	-	+	-	-	50%
Sand fox	1	1	-	-	+	-	100%
Wild cat	1	1	-	-	+	+	100%
Siam cat	3	1	-	-	+	+	100%
		1	-	-	+	-	100%
Mongoos	1	0	-	-	-	-	0
Striped hyaena	1	0	-	-	-	-	0
Hyaena	3	0	-	-	-	-	0
Puma	2	1	-	-	+	-	50%
Spotted leopard	2	2	-	-	+	-	100%
Lions	12	11	-	-	+11	-	91.0%
Tiger	8	3	-	-	+ 3	-	37.5%
Leopard	2	0	-	-	-	-	0
Black leopard	3	1	-	-	-	+	33.3%
Cheetch	6	2	-	-	+ 2	-	33.3%
Total	52	27	1	1	23	4	
%		51.9%	1.9%	1.9%	44.2%	7.7%	51.5%

## COPROLOGY, CARNIVORA, IN ZOOLOGICAL GARDENS

Table (4): Munich Zoological Garden Results of faecal examination of Carnivorous animals in (1991)

Species	No. of Animals	No. Infected	<u>Toxocara</u>	<u>Toxascaris</u>	<u>Isospora</u>	%
Wild cat	3	0	-	-	-	0
Wild dog	2	0	-	-	-	0
Lion	2	0	-	-	-	0
Puma	1	0	-	-	-	0
Chines ele- pard	4	1	-	-	+	25%
Gepard(hunting)	3	3	-	3+	-	100%
Leopard	4	1	-	+	-	25%
Pess leopard	3	0	-	-	-	0
Sibesian tiger	3	0	-	-	-	0
Simatsa tiger	2	0	-	-	-	0
Black panther	2	0	-	-	-	0
Ozelot	2	0	-	-	-	0
Serval	2	0	-	-	-	0
Lyxse	2	1	+	+	-	100%
Sumicata		1		+	-	100%
Tetralachyta.	1	1			+	100%
Total	36	8	1	6	2	
per %		22.2%	2.8%	16.7%	5.6%	

Table (5): Results of coprological examination of carnivor

Vernacular name	No. of animals	No. of infected animals	<u>Toxoc- ara sp.</u>	<u>Toxas- caris sp</u>	Scientific name
Siamese	15	10	3	6	<u>Felis calus</u>
Wild	2	1	1	1	<u>Felis silvestris</u>
Lions	30	3	-	3	<u>Felis leo.</u>
Black leopard	6	2	-	1	<u>Felis pardus</u>
Spotted leopard	5	1	1	-	<u>Felis pardatis</u>
Black Jackeled	25	6	-	4	<u>Canis familiaris</u>
Total	83	23	5	15	
%		27.7%	6.02%	18.1%	

Table (6): Endo parasites of felines (Feloidea) and their prevalence in % D. Barutzki, M. A. Hasslinger, K. Schmid and H. Wiesner (1985).

Parasite	Prevalence percentage
Coccidia	13.9
Ascarids	21.8
<u>Toxascaris</u>	15.8
<u>Toxocara</u>	8.3
<u>Ancylostoma</u>	2.1
<u>Trichuris</u>	1.5
<u>Capillaria</u>	0.6
<u>Angylostrongylus</u>	0.4
<u>Strongyloides</u>	0.2
Cestodes	0.2
n	481
% infection	36.4