PARASITES OF WILDLIFE - I

A PRELIMINARY INVESTIGATION ON THE PARASITES OF WILD ANIMALS AT THE ZOOLOGICAL GARDEN, THIRUVANANTHAPURAM, KERALA

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Abstract

A survey of parasites of wild mammals in the Zoological Garden, Thiruvananthapuram, based on faecal examination revealed that 74 per cent of the wild animals were harbouring helminthic infections including protozoan infections in 23 per cent of the cases. Strongyle, amphistome, *Strongyloides* and *Fasciola* in herbivores, *Ancylostoma*, *Toxascaris*, *Diphyllobothrium* and *Paragonimus* in carnivores and strongyle, *Strongyloides* and *Hymenolepis* in omnivores were the infections noted to be specifically present.

Introduction

Zoological gardens exhibit wild animals for aesthetic, educational and conservation purposes. Parasitic diseases constitute one of the major problems causing even mortality in wild animals in captivity (Rao & Acharjyo, 1984).

Inadequate information on diseases and parasites of zoo animals is a major limiting factor in zoological gardens (Rajasekhariah *et al.*, 1971). A regular programme of disease surveillance and control measures based on correct diagnosis, effective treatment and proper prophylaxis would certainly reverse the situation.

The present investigation has been undertaken as a pioneer study in this context at the Thiruvananthapuram Zoo. The Zoo maintains about 240 wild animals belonging to 35 species of mammals and are claimed to be maintained in good condition.

Material and Methods

One hundred and twenty seven fresh faecal samples were collected from the wild animals kept in individual enclosures and mixed species exhibits. The collected samples were immediately preserved in 2 per cent potassium dichromate and 5 per cent formaldehyde. Then the samples were processed with concentration method of centrifugation-cum-sedimentation technique and examined for parasitic infections. The results are presented in Table 1.

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Results and Discussion

Out of the 127 samples examined, 97 samples (76%) were found positive for parasitic infections, of which 94 samples (97%) had helminthic infections and three samples (3%) had protozoan infections. Among helminth infections, 62 animals (66%) were found to have single or monoinfection with one species of the helminths (viz. trematode, cestode or nematode) and 32 animals (34%) were found positive for more than one species of parasite (multiple infections). Twenty-two samples had protozoan infections as well as helminthic infections. When compared to helminthic infections, the enteric protozoan infections were of lesser magnitude.

Of all the helminthic infections in herbivores, strongyle and amphistome infections were found to be higher in Bovidae and in certain species of Cervidae. Other infections observed in order of prevalence in a variety of herbivores were ascarid, *Strongyloides*, spirurid and *Fasciola*. Among carnivores, *Ancylostoma* and *Toxascaris* were the major infections found in lions, leopards, tigers and jackals. Heavy *Diphyllobothrium* and *Paragonimus* infections were also present in a male leopard. *Isospora* and *Balantidial* cysts were found along with helminthic infections in lions and leopards respectively. In the case of omnivores, strongyle, *Strongyloides*, spirurid, *Fasciola* and *Hymenolepis* were the major helminthic infections. Entamoebic and Balantidial cysts and coccidial oocysts were also observed.

Observations made in the present study based on faecal examinations were comparable with those of some of the recent similar surveys. Occurrence of ancylostome and ascarid infections in wild carnivores like lion, leopard, tiger and jackal have been reported by many workers (Gaur *et al*., 1979; Chauhan *et al*., 1973; Adkoli *et al*., 1986; Muraleedharan *et al*., 1990), an indication of the unhygienic conditions maintained in the

enclosures. The presence of *Paragonimus* infection in leopards has been reported by Pythal *et al*. (1993) during the postmortem of a wild Indian Leopard. This species could be an important natural reservoir host of *Paragonimus*, playing a significant role in the epidemiology of this major zoonotic parasite. Occurrence of strongyle, *Fasciola* as well as amphistome in herbivores like deers, Mithun, Hippopotamus, Nilgiri Tahr, Giraffe and also strongyle, *Strongyloides* and coccidial infections in omnivores like Wild Boar, porcupines, macaques and bears have also been reported in earlier surveys (Gupta, 1974; Tripathy *et al*., 1971; Muraleedhran *et al*., 1990; Reddy *et al*., 1992).

The present study showed that the helminths and protozoans present in the wild animals examined were far less significant as manifesters of clinical disorders. However, Muraleedhran *et al*. (1990) have stated that helminthic or sub-clinical coccidial infections might not cause any immediate alarming signs of disease but in the long course, they might produce ill effects such as emaciation and general weakness which would in due course be responsible for inviting other pathogens. Although deworming is reportedly carried out at the Zoo twice annually, it was apparent from the results of the study that the efficacy of the same was not being ensured. Therefore, even low grade infections should not be neglected and conducting epizootiological surveys are necessary to study the prevalence of parasitic infections. The results of this study may invite a more comprehensive study into the epidemiology, pathogenesis, treatment and prophylaxis of parasite diseases in wild mammals.

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Table 1. Prevalence of parasitic infections in the animals of the Zoological Garden, Thiruvananthapuram.

Hosts	No.of animals at zoo	No. of animals examined	Samples found positive for parasitic infection	Helminthic infection			Protozoan infection		
				Samples showing single infection	Samples showing mixed infection	Type of infection **	No. having also helminth infection	No. having no helminth infection	Type of infection **
Herbivores									
Spotted Deer *Axis axis*	50*	23	18	9	9	Strongyle (6) Strongyloides(1) Amphistome (7) Spirurid (9) Ascarid (4)	3	-	Coccidia (3)
Sambar *Cervus unicolor*	36*	16	12	8	4	Strongyle (5) Strongyloides (1) Amphistome (5) Spirurid (3) Ascarid (2)	3	-	Coccidia (3)
Hog Deer *Axis porcinus*	19*	12	5	4	1	Strongyle (4) Capillaria (1) Spirurid (1)	-	-	-
Blackbuck *Antilope cervicapra*	13*	9	7	7	-	Strongyle (4) Strongyloides (1) Amphistome (2)	2	-	Coccidia (2)
Barking Deer *Muntiacus muntjak*	5*	2	2	2	1	Strongyle 2-types (2) Spirurid (1)	-	-	-
Nilgiri Tahr *Hemitragus hulocrius*	2	2	2	-	2	Strongyle (2) Spirurid (2)	-	-	-
Nilgai *Boselaphus tragocamelus*	6*	3	-	-	-	-	-	-	-

Hosts	No.of animals at zoo	No. of animals examined	Samples found positive for parasitic infection	Helminthic infection: Samples showing single infection	Helminthic infection: Samples showing mixed infection	Helminthic infection: Type of infection **	Protozoan infection: No. having also helminth infection	Protozoan infection: No. having no helminth infection	Protozoan infection: Type of infection **
Cape Buffalo *Syncerus caffer*	2	2	2	1	1	Toxocara Amphistome (1) Strongyle (1)	-	-	-
Mithun *Bos sondaicus*	5	3	3	3	-	Amphistome (3)	1	-	Coccidia (1)
Giraffe *Giraffa camelopardalis*	1	1	1	-	1	Strongyle Spirurid (1)	-	-	-
Hippopotamus *Hippopotamus amphibius*	4	2	2	1	-	Stronglye (1)	1	1	Coccidia (2)
Indian Rhinoceros *Rhinoceros unicornis*	2	2	2	1	1	Fasciola Amphistome (1) Spirurid (2)	2	-	Coccidia (2)
Asian Elephant *Elephas maximus*	1	1	1	1	-	Strongyle (1)	1	-	Ciliates (1)
Hare *Lepus nigricollis*	1	1	1	1	-	Spirurid (1)	-	-	-
Omnivores									
Wild Boar *Sus scrofa*	19*	15	15	9	5	Fasciola (2) Strongyle (10) Strongyloides (5)	5	1	Entamoeba (3) Balantidium (3)
Palm Civet *Viverricula indica*	1	1	1	1	-	Spirurid (1)	-	-	-
Hyaena *Hyaena hyaena*	2	2	2	2	-	Toxocara (1) Strongyle (1)	-	-	-

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Porcupine *Hystrix indica*	7*	5	5	2	3	Strongyloides (5) Strongyle (3) Hymenolepis (1)	2	-	Coccidia (2)
Rhesus Macaque *Macaca mulatta*	2	2	-	-	-	-	-	-	-
Bonnet Macaque *Macaca radiata*	9*	3	1	-	-	-	-	1	Coccidia (1)
Pig-tailed Macaque *Macaca nemestrina*	1	1	1	-	1	Strongyle Strongyloides Spirurid (1)	-	-	-
Sloth Bear *Melursus ursinus*	2	2	2	2	-	Strongyle (2)	-	-	-
Toddy Cat *Paradoxurus hermaphroditus*	2	2	2	2	-	Strongyle (2)	-	-	-
Carnivores									
Jungle Cat *Felis chaus*	1	1	1	1	-	Toxocara (1)	-	-	-
Jackal *Canis aureus*	6*	3	3	3	-	Ancylostoma (3)	-	-	-
Indian Fox *Vulpes vulpes*	1	1	-	-	-	-	-	-	-
Lion *Panthera leo*	15	5	2	2	-	Toxascaris (2)	1	-	Isospora (1)
Tiger *Panthera tigris*	5	2	2	-	2	Ancylostoma (2) Strongyloides(2) Toxocara (1)	1	-	Balantidium (1)

Hosts	No. of animals at zoo	No. of animals examined	Samples found positive for parasitic infection	Helminthic infection Samples Showing single Infection	Samples showing mixed	Type of infection **	Protozoan infection No. having also helminth infection	No. having no helminth infection	Type of infection **
Leopard *Panthera pardus*	2	2	2	1	1	Toxascaris (2), Diphyllbothrium Paragonimus (1)	-	-	-
Giant squirrel *Ratufa indica*	1	1	-	-	-	-	-	-	-
Total percentage in parentheses		127	97(76)	62(66)	32(34)		22(23)	3(3)	

* Animals were maintained in groups

** Figures in parentheses indicate the number of animals infected.