

## PREVALENCE OF PARASITIC INFECTION IN CAPTIVE WILD HERBIVORES IN A ZOO IN ASSAM, INDIA

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### ABSTRACT

Parasites found at post mortem in 214 animals of 3 orders captive wild herbivores of Assam State Zoo from 1985 to 1989 were studied. The different nematodes recorded were *Haemonchus*, *Ascaris*, *Gongylonema*, *Trichostrongylus*, *Oesophagostomum*, *Setaria*, *Dictyophyma*, *Cooperia*, *Onchocerca*, *Trichuris*, *Kululima*, *Chabertia*, *Necator*, *Bunostomum*, *Dictyocaulus*, *Harbronema*, *Chonigium*, *Grammacephalus* and the trematodes were *Fasciola*, *Paramphistomum*, *Gastrothylax*, *Fischoederius*, *Carmyerius*, *Cotylophoron*, *Gigantocotyle*, *Homologaster*, *Pseudodiscus*, *Pfenderius* and *Brumpticca*. The cestode parasites found in the study were *Moneizia*, *Anoplocephala*, *Hydatid* cyst and *Cysticercus*. In addition to these, protozoa such as *Sarcocystis*, *Eimeria*, *Balantidium coli* and ectoparasite like *Boophilus microplus*, *Gasterophilus intestinalis*

and *Cobboldia elephantis* were recorded during the study.

### Introduction

There are only sporadic reports of parasitic infections in different zoo animals in India (Chauhan *et al.*, 1973; Gaur *et al.*, 1979; Khan, 1979), but a systematic study in these animals is lacking. We report the prevalence of various parasites at post mortem in the captive wild herbivores of Assam State Zoo, India.

### Materials and methods

214 captive wild herbivores of Assam State Zoo from 1985 to 1989 were necropsied to ascertain the cause of death. In post mortem examination, the alimentary tract and other internal organs including aorta were examined for presence of parasites. Blood smears from the heart of the carcasses stained with Giemsa were also examined for the presence of blood parasites. Pieces of tissue samples were preserved in 10% formol-saline solution for histopathological study to note the presence of parasite in the tissue sections.

### Results and discussion

Parasites found in animals of order Artiodactyla and animals of Perrisodactyla and Proboscidea have been presented in Table 1 and 2, respectively.

Among nematodes recorded in our study, *Trichuris*, *Haemonchus*, *Sirongylus*, *Oesophagostomum* and *Onchocerca* were reported earlier by Patnaik (1964), Khan (1979) and

Acharjyo and Rao (1987), respectively. We did not find a reference to the presence of *Gongylonema*, *Cooperia* and *Setaria* in wild herbivores. In the present study a 4th stage *Dictyophyma* larva was found in the kidney of a black buck, this is apparently the first *Dictyophyma* infection in a black buck. *Trichurias* and *Ascaris* in giraffe have also been recorded by Dagg and Foster (1976).

Among trematodes, prevalence of *Paramphistomum* was the highest. *Fasciola gigantica* infection was seen only in spotted deer of the Cervidae family which support the findings of Rao and Acharjyo (1972), however, *F. gigantica* in other animals of Bovidae family were noticed. Prevalence of *Gastrothylax*, *Cotylophoron*, *Carmyerius*, *Fischoederius*, *Gigantocotyle* and *Homologaster* were low and were recorded earlier by Patnaik (1964), Patnaik and Acharjyo (1970), Chauhan *et al.* (1970), Chauhan *et al.* (1970), Agrawal and Ahluwalia (1980) and Padhi *et al.* (1987).

Among cestodes, the prevalence of *Cysticercus* was highest as reported earlier by Khan (1979).

Among the Perrisodactyla, only two species of animals viz., rhinoceros and zebra were studied. In rhinoceros four species of nematode parasites such as *Kililuma goodeyi*, *Chabertia*, *Necator americans* and *Bunostomum* were noticed in the study and of these the last three were documented by Silberman and Fuloton (1979).

Of the trematodes - *Paramphistomum* and two unidentified conical flukes were recorded in rhinoceros in the study. Reports of fluke infection in rhinoceros was not available in the literature.

Among cestodes, *Anoplocephala* was found to be the commonest parasite of rhinoceros. In the present study, *Anoplocephala* was found in the bile duct of 4 animals in addition to the small intestine. A hydatid cyst in the liver of a rhinoceros was noticed in the study which has not been reported earlier.

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Table 1. Parasites recovered at post mortem in animals of the order : Artiodactyla

Parasites	Family - Cervidae				Family - Tragulidae	Family - Bovidae						Family - Giraffidae	Total
	Spotted deer (33)*	Barking deer (41)	Sambar (42)	Hog deer (11)	Mouse deer (6)	Black buck (12)	Nilgai (17)	Serow (12)	Ladakhhi goat (3)	Mithun (4)	Water buffalo (1)	Giraffe (5)	
Nematode :													
<i>Haemonchus</i>	-	3**	-	-	-	3	-	3	1	-	-	-	3
<i>Ascaris</i>	-	-	-	-	-	-	-	-	-	-	-	-	2
<i>Gongylonema</i>	2	-	3	-	1	-	2	2	-	-	-	1	11
<i>Trichostrongylus</i>	-	1	-	-	-	-	-	-	-	-	-	-	1
<i>Setaria</i>	-	2	2	-	-	-	-	-	-	-	-	-	4
<i>Oesophagostomum</i>	-	-	-	-	1	-	-	-	-	-	1	-	2
<i>Dicyophyma</i>	-	-	-	-	-	1	-	-	-	1	-	-	2
<i>Cooperia</i>	-	-	-	-	-	-	1	-	-	-	-	-	1
<i>Onchocerca</i>	3	-	1	-	-	1	1	-	-	1	-	-	7
<i>Trichuris</i>	-	-	-	-	1	3	-	5	-	1	1	-	15
Trematode :													
<i>Fasciola gigantica</i>	18	-	-	-	-	-	-	1	-	1	1	-	21
<i>Paramphistomum</i>	26	21	31	5	2	4	3	5	2	2	1	-	100
<i>Gastrothylax</i>	3	-	5	-	-	-	-	-	-	1	1	-	9
<i>Fischoederius</i>	18	8	9	3	-	-	-	-	-	1	1	-	40
<i>Carmyerius</i>	-	-	-	-	-	1	-	-	-	1	-	-	2
<i>Cotylophora</i>	3	-	-	-	-	-	-	-	-	-	-	-	3
<i>Gigantocotyle</i>	-	-	1	-	-	-	-	-	-	-	1	-	2
<i>Homologaster</i>	-	-	-	-	-	-	-	-	-	-	1	-	1
Cestode :													
<i>Moniezia</i>	-	-	-	-	-	-	-	3	1	-	-	-	4
Hydatid cyst	1	-	-	-	-	-	-	-	1	-	-	11	3
<i>Cysticercus</i>	2	1	2	-	-	1	1	-	-	-	-	-	7
Protozoa :													
<i>Sarcocystis</i>	5	2	2	-	1	-	2	1	-	1	-	-	14
<i>Eimeria</i>	2	2	-	-	-	-	1	2	-	1	-	-	8
<i>Balantidium coli</i>	-	-	-	-	-	-	-	-	-	-	-	1	1
Tick :													
<i>Boophilus microplus</i>	-	-	-	-	-	-	-	-	-	1	-	-	1

\*Figures indicate animal examined.

\*\*Figures indicate animal positive.



TABLE 2. PARASITES RECOVERED AT POST MORTEM IN ANIMALS OF THE ORDER PERRISODACTYLA AND PROBOSCEIDA

Parasites	Perrisodactyla		Proboscidea	Total
	Rhinocerotidae	Equidae	Elephantidae	
	Rhinoceros (12)*	Zebra (4)	Elephant (3)	
Nematodes :				
Killiluma Goodeyi	1**	-	-	1
Chabertia	1	-	-	1
Necator americanas	3	-	-	3
Bunostomum	2	-	-	2
Dictyocaulus arnfieldi	-	2	-	2
Habronema	-	1	-	1
Choniagium	-	-	2	2
Grammocephalus hybridus	-	-	2	2
Trematodes :				
Paramphistomum	2	-	-	2
Unidentified conical fluke	2	-	-	2
Pseudodiscus	-	-	1	1
Pfenderius	-	-	1	1
Brumptica	-	-	1	1
Fasciola Jacksoni	-	-	2	2
Cestode :				
Anoplocephala	7	-	-	7
Hydatid cyst	1	-	-	1
Protozoa :				
Balantidium coli	-	-	-	1
Ectoparasite :				
Gastrophilus intestinalis	-	1	-	1
Cobboldia elephantis	-	-	1	1

\* Figures indicate member of animal examined.

\*\* Figures indicate number of animal positive.

*Balantidium coli* infection was also noticed in histopathological study of intestine of one rhinoceros which was also noticed by Reddy *et al.* (1984).

The nematode parasite *Dictyocaulus arnfieldi* and *Habronema* which were recorded in zebra of the present study, were earlier reported by Dooley and King (1977) and Krecek *et al.* (1987). In addition few larva of *Gastrophilus intestinalis* was also noticed in a zebra.

Among Proboscidea, three elephants were examined where nematode parasite such as *Choniagium* and *Grammocephalus hybridus* and trematode viz., *Pseudodiscus*, *Pfenderius*, *Brumptica* and *Fasciola jacksoni* could be recorded. Prevalence of these parasites were also recorded by Pillary *et al.* (1976) and Singh (1988). Larva of *Cobboldia elephantis* was also recorded in one animal.

During the study, heart blood smear of 116 animals were screened for the presence of blood parasite and the study revealed microfilaria in two barking deer only.

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#### REFERENCES

- Acharjyo, L.N. and Rao, A.T. (1987). Mortality pattern in some Indian captive wild ruminants. *Indian J. Anim. Sci.*, 57(5) : 430-435.

- Acharjyo, L.N. and Rao, A.T. (1988). *Sarcocystosis* in some Indian wild ruminants. *Indian Vet.J.* 65 (2) : 169-170.
- Agarwal, R.D. and Ahluwalia, S.S. (1980). A note on the occurrence of *Gastrothlax crumenifer* in Sambhar (*Cervus unicolor*). *Indian Vet.J.* 57 (5) : 436.
- Chauhan, P.P.S.; Bhatia, B.B., Arora, G.S., Agarwal, R.D. and Ahluwalia, S.S. (1973). A preliminary survey of parasitic infection among mammals and birds at Lucknow and Delhi Zoos. *Indian J. Anim.Sci.* 43 (2) : 163-168.
- Dagg, A.I. and Foster, J.B. (1976). *The Giraffe, its Biology, Behaviour and Ecology*. Van Nostrand Reinhold : New York, 1976. pp.41-150.
- Dooley, D.E. and King, E.M. (1977). *Dictyocaulus arnfieldi* infection in a Hartmann's Zebra : A case study. *J. Zoo Anim. Med.* 8 : 16-17.
- Gaur, S.N.S., Sethi, M.S., Tewari, H.C. and Prakash, O.M. (1979). A note on the prevalence of helminth parasites in wild and zoo animals in Uttar Pradesh. *Indian J. Anim. Sci.* 49(2) : 159-161.
- Gray, C.W. (1966). Taeniasis in the Indian Rhinoceros. Annual Report. Smithsonian Institution. National Zoological Park, 1966, p.10.
- Khan, A.M. (1979). Incidence of different parasites in Wildlife of Nehru Zoological Park, Hyderabad. Proc. of Summer Institute on Pathology of Diseases of Wildlife held at U.A.S., Bangalore. from 15th to 29th May, 1979.
- Krecek, R.C.; Francosis, S.M., Reinecke, R.K. and Vos, V. (1987). Nematode parasites from Burchall's zebras on South Africa *J.Wildl. Dis.* 23(3) : 404-411.
- Padhi, B.C., Mohanty, A.K., Misra, S.C. and Panda, D.N. (1987). A note on the occurrence of amphistomes in the rumen of spotted deer (*Axix axis*) at the Nandankanan Biological Park, Barang, Orissa, *Indian Vet. J.* 64 (10) : 893.
- Patnaik, M.M. (1964). A note on the helminth parasites of the black buck (*Antilope cervicapra*). *Curr. Sci.* 33(6) : 180
- Patnaik, M.M. and Acharjyo, L.N. (1970). Notes on the helminth parasite of vertebrates in Baranga Zoo (Orissa). *Indian Vet.J.* 47 : 723-730.
- Pillary, S.K.R., Rahman, S.A., Hedger, K.S. and Rajasekaran, D. (1976). Grammocephalosis in an Indian elephant in Karnataka. *Indian Vet.J.* 53 : 670-671.
- Rao, A.T. and Acharjyo, L.N. (1972). Further observations on fascioliasis among wild ungulates at Nandankanan Zoo. *Indian Vet.J.* 47 (2) : 123-125.
- Reddy, K.R., Kulkarni, D., Alokha, M.G. and Ramakrishna, K. (1984). Balantidiosis in white rhinos. *Livestock Adviser* 9 : 49-52.
- Silberman, M.S. and Fulton, R.B. (1979). Medical problems of captive and wild rhinoceros - A review of the literature and personal experiences. *J. Zoo Anim. Med.* 10 : 6-16.
- Singh, K.S. (1988). Helminth parasites of Indian elephants. M.V.Sc. thesis submitted to Kerala Agricultural University, Trichur.