Studies on prevalence of endo-parasitic infection in wild carnivores maintained under captive state

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Abstract The present study was conducted to observe the prevalence of endo-parasites in wild carnivores maintained under captive state at Tyavarekoppa Tiger and Lion Safari unit near to Veterinary College, Shimoga. A total of 54 wild carnivores were included in the study and the fresh fecal samples were collected, examined on the same day by direct and sedimentation techniques for endo-parasitic eggs/ova in the laboratory. Out of 15 tigers samples screened, 12 were harboring mixed infections of *Strongyle* spp., *Toxocara* spp, oocysts of coccidia and *Spirometra* spp. ova/eggs. Among 21 leopards sample screened, only 11 fecal samples showed eggs of *Toxocara* spp. and three showed eggs/ova of *Spirometra* spp. Of the 12 lion fecal samples examined, only 3 harbored eggs *Toxocara* spp. and two showed mixed infections of *Strongyle* spp., *Toxocara* spp, oocysts of coccidia. Among six Jackals screened, three faecal samples found positive for *Strongyle* spp. and *Toxocara* spp. eggs/ova.

Keywords Wild carnivores · Prevalence · Endo-parasitic eggs/ova · Faecal sample

Introduction

The health status of zoo animals varies with different factors such as management, feeding, environment, sanitation and season. The wild animals harbour many parasites naturally, but severity depends on the status of the body

(Gaur et al. 1979). The wild animals maintained in zoological gardens under aesthetic environment is for educational and conservation purpose. But parasitic infections constitute one of the major problems causing even mortality in wild animals in captivity (Rao and Acharjyo 1984). Inadequate information on parasitic diseases of wild animals is of major limiting factor in zoological gardens (Rajashekaraiah et al. 1971). Many workers have recorded the incidence of different parasites in captive wild animals (Maske et al. 1990; Chakraborty et al. 1994; Varadharajan and Pythal 1999; Muraleedharan et al. 1990 and Kashid et al. 2002).

Many species of carnivores especially felids, canids, hyenas, bears, mongooses, otters and red panda are usually exhibited in most of the Indian zoos (Acharjyo 2004). The wild big cats in captive state are susceptible to many diseases. The health monitoring and disease diagnosis in these animals is a challenging job for veterinarians, since difficulty in collection of clinical samples. Therefore, the present study was attempted to study the actual status of gastro-intestinal parasites in big cats viz., tiger, lion and leopard maintained under captive state at Tiger and Lion Safari unit, Tyavarekoppa near to Veterinary College, Shimoga.

Materials and methods

In the present study, a total of 54 fecal samples from wild carnivores viz., tiger, lion, jackals and leopard maintained under captive state at Tyavarekoppa Tiger and Lion Safari unit were included. About 5–10 g of freshly laid fecal samples from each animal was collected in interlocked polythene bags and brought to the laboratory and stored in refrigeration until examination. The polythene bags

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containing the faecal samples were labelled with date and time of sample collection and were properly sealed (Shirbhate 2007). In the laboratory, the samples were processed by qualitative methods faecal sample examination like direct and sedimentation technique for the detection of gastrointestinal parasitic eggs/ova as per standard protocols given by Bowmann (2009). Then, the parasitic eggs/ova were identified on the basis of their morphology and micrometry (Soulsby 1982; Bowmann 2009).

Results and discussion

The prevalence of endo-parasites of captive wild carnivores such as 15 tigers, 21 leopards, 12 lion and six jackals were studied and presented in the Table 1. A total of 54 wild carnivores fecal samples were screened by qualitative methods of fecal sample examination and found 34 (63.0 %) samples harbored both enteric helminthes and protozoan parasites and positive for single or mixed infection. The study conducted by Singh et al. (2010) found the overall prevalence rate of 56 % in big cats in Van Vihar National Park, Bhopal, Madhya Pradesh. The little higher prevalence rate in the present study might be due to variation in the number of fecal sample screened, the geographical location and managerial practices adopted. In the present study, the highest prevalence of *Toxocara* spp. (88.2 %) was observed followed by *Strongyle* spp. (50.0 %), *Spirometra* spp. (47.0 %) and oocysts of coccidian (41.17 %). This is in accordance with the Singh et al. (2010) reported the maximum prevalence of ascarids (44 %) followed by strongyle (32 %) and coccidian (16 %) parasites.

Among 15 tigers fecal samples screened, 12 (80.0 %) were harboring mixed infections of *Strongyle* spp. (Fig. 1), *Toxocara* spp. (Fig. 2), oocysts of coccidian (Fig. 3) and *Spirometra* spp. (Fig. 4) ova/eggs. This is in accordance with the study conducted by Shrikande et al. (2008) who reported the highest prevalence of *Toxocara* spp. (85.7 %) in Bengal tiger and low prevalence of *Spirometra* spp.

Fig. 1 Eggs of *Strongyle* spp. (×1,000)

Fig. 2 Eggs of *Toxocara* spp. (×1,000)

Table 1 Prevalence of gastrointestinal parasites of captive wild carnivores

Species	No. screened	No. positive	% positive	Types of endo-parasites				Mixed infection
				<i>Strongyle</i> spp.	<i>Toxocara</i> spp.	<i>Spirometra</i> spp.	Coccidian oocyst	
Tiger	15	12	80.0	12	12	12	12	12
Leopard	21	14	66.6	—ve	10	04	—ve	00
Lion	12	05	41.6	02	05	—ve	02	02
Jackal	06	03	50.0	03	03	—ve	—ve	03
Total	54	34	63.0	17	30	16	14	17
Percent prevalence				50.0	88.2	47.0	41.17	50.0

Fig. 3 Coccidian oocyst ($\times 1,000$)

Fig. 4 Eggs of *Spirometra* spp. ($\times 1,000$)

(20 %) ova in white tiger. Out of 21 leopards sample screened, 14 (66.6 %) found positive for different helminthes parasites, of which 10 samples showed eggs of *Toxocara* spp. and 04 showed eggs/ova of *Spirometra* spp. In case of lion, a total of 12 faecal samples were examined and found 05 (41.6 %) positive for gastrointestinal parasites in which only 03 harbored eggs of *Toxocara* spp. and two showed mixed infections of *Strongyle* spp., *Toxocara* spp. and Coccidian oocysts. Among six jackals were examined, 03 (50.0 %) of the faecal samples showed parasitic eggs of *Toxocara* spp. and *Strongyle* spp.

The study conducted by Singh et al. (2010) found 63.63 % prevalence of gastrointestinal parasites in tigers with 57.14 % mixed infection, 25 % in lion with no mixed infection whereas, highest prevalence rate of 83.33 % with 80 % mixed infection in leopard. However, in the present study all the tigers 12 (80.0 %) showed mixed infection, no mixed infection observed in leopards and jackals whereas, two lions showed mixed infection. This could be due to food and water contamination with the faeces. Kashid et al. (2002) reported the incidence of gastro-intestinal helminthes in captive wild animals at six locations like Kanha national park, Gemini circus, Deer park at Nagpur, Maharajbagh zoo at Nagpur, Siddharth zoo at Aurangabad and Peshwe park at Pune found 31.65 % in tiger, 96.13 % in cheetah, 35.72 % in lions, 88.33 % in peacocks and 2.42 % in jackals, hyenas, sambar, nilgai and black bucks. Ahasan et al. (2010) reported the prevalence of parasitic infection in captive wild carnivores at Dhaka zoo and found higher prevalence of *Toxocara* spp., *Strongyloides* spp. and *Ancylostoma* spp. in all group of carnivores.

However, in the present study the prevalence of endoparasites found 80.0 % in tiger followed by 66.6 % in leopard, 41.6 % in lion and 50.0 % in jackals. The variation in the prevalence rate might be due to number of faecal samples included in the study, geographical difference and managerial practices adopted in the zoos.

In the present study, 12 tigers and 02 lion faecal sample showed the presence of coccidian oocyst (41.17 %). The incidence of coccidiosis in captive wild animals has been reported by many workers in tiger, lion, leopard and hyaena (Patnaik and Acharjyo 1970) and in white tiger by (Choudhary and Choudhary 1982). There are several factors are responsible for the survival and development of infective stages of parasite, but mainly the managerial and feeding practices and environmental factors play an important role. It is concluded that, in the present study, an attempt was made to document the prevalence of endoparasitic infection in wild carnivores maintained under captive state since there is a paucity of information. The wild carnivores under captive state do harbour many parasites in their body and they affect the health and production performance of the animals hence it is required to conduct a detail and systematic work in this regard.

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References

- Acharjyo LN (2004) Helminths in captive wild carnivores and its control. *Zoos Print J* 19(7):1540–1543

- Ahasan SA, Md. Salim I, Md. Shakif UA (2010) Prevalence of parasitic infestations in captive wild carnivores at Dhaka Zoo. *Zoos print* 25:34–36
- Bowmann DD (2009) *Georgi's parasitology for veterinarians*, 9th edn. Saunders Elsevier, St Louis
- Chakraborty A, Gogoi AR, Choudhary B (1994) Prevalence of parasitic infection in captive wild herbivores in a zoo in Assam, India. *Int J Anim Sci* 9:149–152
- Choudhary SK, Choudhary A (1982) Relationship between sporulation and effect of temperature and chemical exposure on *Isosporoid coccidium* in a white tiger (*Panthera tigris*) in zoological Garden Calcutta. *International Symposium Academic Verlag, Berlin, GDR*
- Gaur SNS, Sethi MS, Tewari HC, Prakash O (1979) A note on prevalence of helminth parasites in wild and zoo animals in Uttar Pradesh. *Indian J Anim Sci* 46:159–161
- Kashid KP, Shrikhande GB, Bojne GR (2002) Incidence of gastrointestinal helminths in captive wild animals at different locations. *Zoos Print J* 18:1053–1054
- Maske DK, Bhilegaonkar NC, Sardey MR (1990) Helminth parasites in zoo animals of Maharajbagh, Nagpur, Maharashtra State. *Indian J Anim Sci* 5:277–278
- Muraleedharan K, Iswaraiah V, Syed Ziauddin K, Srinivasan K (1990) A survey of gastro-intestinal parasites of animals of zoological gardens at Mysore. *Mysore J Agric Sci* 24:250–256
- Patnaik MM, Acharjyo LN (1970) Notes on the helminth parasites of vertebrates in Baranga Zoo (Orissa). *Indian Vet J* 48:1072–1073
- Rajashekaraiah GR, Hegde KS, Gowda RNS, Rahman SA, Rao HS (1971) A study of some parasites from panther cubs (*Felis pardus* Linn.) with description of *Eimeria anakalensis* (N.Sp.). *Mysore J Agric Sci* 5:404–409
- Rao AT, Acharjyo LN (1984) Diagnosis and classification of common diseases of captive animals at Nandankanan Zoo in Orissa (India). *Indian J Anim Heal* 33:147–152
- Shirbhate MV (2007) Quantification of predation and incidence of parasitic infestation in Melghat Tiger Reserve with special reference to Leopards (*Panthera pardus*). *Bioscan* 2(1):41–46
- Shrikande GB, Ashlesha KS, Suhasini SZ, Maske DK (2008) Helminth parasites in captive wild animals of Rajive Gandhi zoological park. *Vet World* 1(7):207
- Singh S, Shrivastav AB, Sharma RK (2010) Prevalence of gastrointestinal parasites in big cats in Van Vihar National Park, Bhopal. *J Vet Parasitol* 24(1):51–54
- Soulsby EJJ (1982) *Helminths, arthropods and protozoa of domesticated animals*, 8th edn. English Language Book Society and Baillere Tindal, London
- Varadharajan A, Pythal C (1999) A preliminary investigation on the parasites of wild animals at the zoological garden, Thiruvananthapuram, Kerala. *Zoos print J* 3:159–164