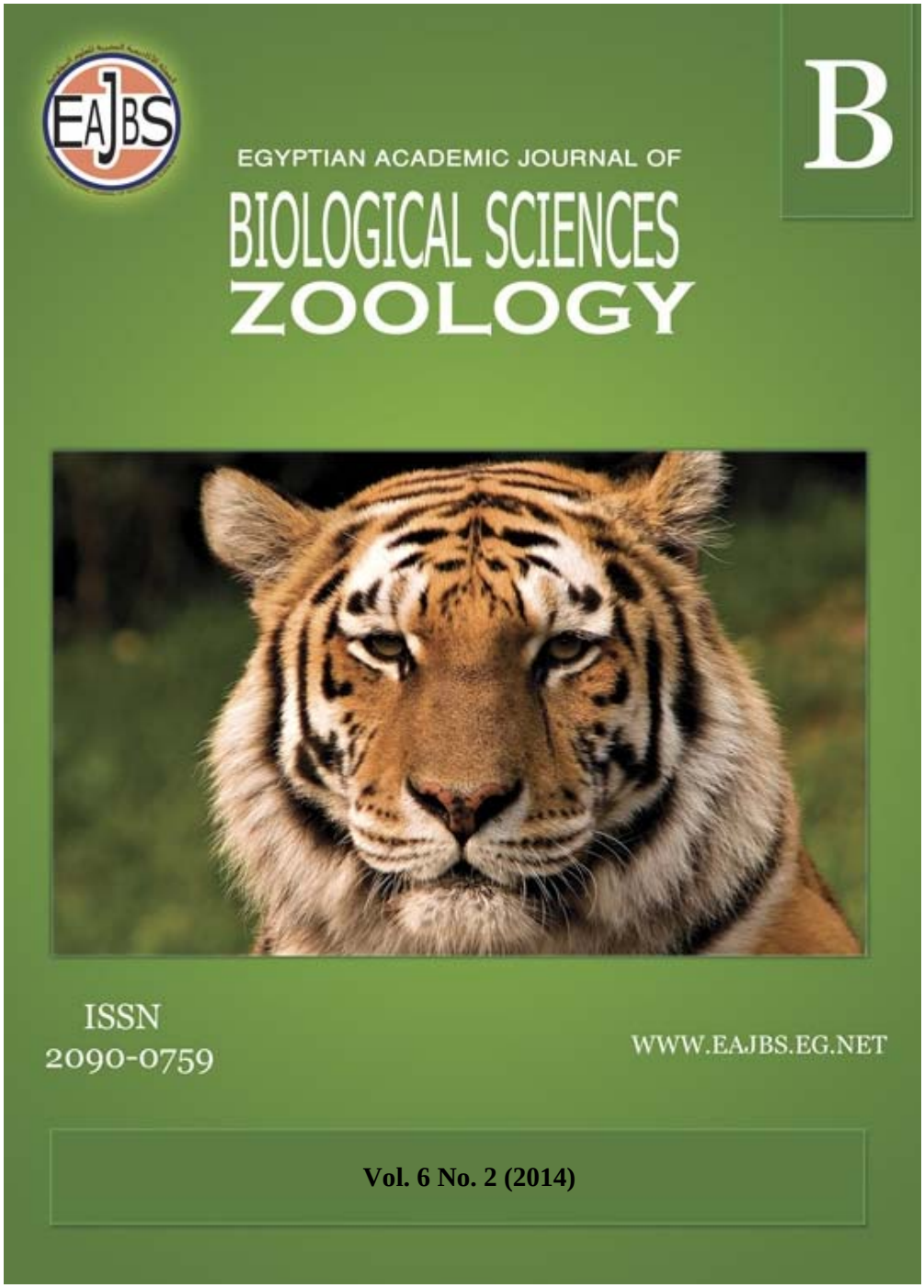


Egyptian Academic Journal of Biological Sciences is the official English language journal of the Egyptian Society of Biological Sciences ,Department of Entomology ,Faculty of Sciences Ain Shams University .

The Journal publishes original research papers and reviews from any zoological discipline or from directly allied fields in ecology, behavioral biology, physiology, biochemistry, development, genetics, systematics, morphology, evolution , and general zoolology

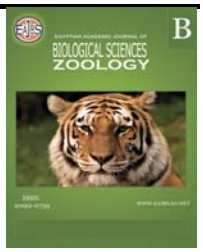
www.eajbs.eg.net

Received : 25/10/2014 Accepted :15/12/2014

Egypt. Acad. J. Biolog. Sci., 6(2): 23- 27 (2014)

Egyptian Academic Journal of Biological Sciences
B. Zoology

ISSN: 2090 – 0759
www.eajbs.eg.net



Parasitic fauna of captive mugger crocodiles (*Crocodylus palustris*) in south India

NV Rajesh[1,*], R Kalpana Devi[2], MG Jayathangaraj[1], M Raman[3] and R Sridhar[3]

1- Department of Wildlife Science, Madras Veterinary College, TANUVAS, Chennai -07, Tamilnadu, India

2- Department of Botany and Microbiology, A.V.V.M Sri Pushpam College, Bharathidasan University (Affiliated), Poondi – 613 503, Tamilnadu, India

3- Department of Veterinary Parasitology, Madras Veterinary College, TANUVAS, Chennai -07, Tamilnadu, India

E-mail: crocvet@gmail.com

ABSTRACT

Coprological samples of captive mugger Crocodiles (*Crocodylus palustris*) were randomly collected (102 Nos) from Snake Park, Guindy (36 Nos), Arignar Anna Zoological Park, Vandalur (44 Nos) and Amaravathy Crocodile farm (22 Nos) and screened for evidence of parasitic fauna using fecal sedimentation technique. Parasitic fauna evidenced trematode egg, Renifers which were predominant in Snake Park, Guindy and Amaravathy Crocodile farm and nematode eggs, *Dujardinascaris* sp. in samples from Arignar Anna Zoological Park, Vandalur. Among the study, *Dujardinascaris* sp. was predominant and mixed infections of Renifers and *Ophiotaenia* sp. were limited. However *Polydelphis* sp. was observed only in Amaravathy farm. Renifers and *Dujardinascaris* sp. were found in mugger crocodiles from all these three locations. No ectoparasites were encountered in mugger crocodiles during this study. Snake Park, Guindy and Amaravathy Crocodile farm had the habit of feeding fishes to this reptile encountered the presence of trematode and cestode eggs in these areas. Captivity provides the condition in such a way that ectoparasites could not be ruled out in this study unlike free-ranging habitat.

Keywords: Parasites, Mugger Crocodiles, *Crocodylus palustris*, Renifers, *Dujardinascaris* sp., *Ophiotaenia* sp., *Polydelphis* sp.

INTRODUCTION

Reptiles harbour a variety of helminthes. The parasitic burden is often heavy and may be invaded by some kind of larval or adult parasites. In zoo, captivity caused stress and this may change the host parasite relationship and results in a disease. The parasitic diseases of reptiles have been reviewed by (Momin *et al*. 1990). Wild and captive reptiles are infected and infested with a great variety of parasites. Numerous parasites are responsible for illness and death in captive reptiles. The difference in the host parasite relationship between captive and wild reptiles must be considered. Although reptiles in the wild are not without stresses, they obviously do not undergo

Received : 25/10/2014 Accepted :15/12/2014

the stresses of captivity. In captivity, we confine the reptiles in most cases, to relatively small areas thus contributing to the increased parasite load (Mader, 1996), especially of those parasites with direct life cycles. The variation in the diet of wild reptiles is also advantageous. The reptiles may harbour parasites for considerable lengths of time before showing signs of illness, clinical disease may be seen later when predisposing factors compromise the host immunologically and allow the development of evident infection. The present study focused on the screening of coprological samples for parasitic fauna in mugger crocodiles under captive condition.

MATERIALS AND METHODS

Place and period of study

The study was carried out in Snake Park, Guindy, Arignar Anna Zoological Park, Vandalur and Amaravathy Crocodile farm of South Tamilnadu. The study was conducted during the winter season from November to January, under captive condition for a period of 3 months.

Collection and processing of coprological samples

Coprological samples were collected from captive mugger crocodiles reared at Snake Park, Guindy (36 Nos), Arignar Anna Zoological Park, Vandalur (44 Nos), and Amaravathy Crocodile farm (22 Nos) and hence a total number of 102 samples were obtained in labeled containers. Sedimentation technique was used for fecal examination depicted by (Soulsby, 1982).

Intensity of parasitic infection by egg per gram (EPG)

One gram of feces was mixed with 10 ml of water, centrifuged, and 1 ml of sediment was examined under microscope. The number of eggs of parasite per gram was estimated by (Urquhart *et al*., 1996) using the formula:

$$\frac{\text{Number of eggs} \times 10}{1} = \text{Number of eggs}$$

Where 10 = Dilution factor

1= quantity of solution examined in ml.

Identification of nematode eggs

Nematode eggs were identified by the shape, size, and other species specific characters of the particular parasitic ova (Fowler, 1986; Rosenthal, 1997).

RESULTS

Coprological analysis showed Renifers egg with highest percentage in Snake Park, Gunidy **(**36.1%) and Amaravathy Crocodile farm (22.7%). Endoparasitic incidence related with *Dujardinascaris* sp. was more (36.4%) at Arignar Anna Zoological Park, Vandalur and the incidence was higher than other endoparasites encountered (Table 1). Eggs of *Ophiotaenia* sp. were found in samples from Snake Park, Gunidy (8.3%) and Amaravathy Crocodile farm (13.7%). Eggs of *Polydelphis* sp. were found only in Amaravathy Crocodile farm. Evidences of mixed infection and coccidian parasites were also furnished in the table. Eggs of Renifers, *Dujardinascaris* sp., *Ophiotaenia* sp., *Polydelphis* sp., oocysts of *Isospora* sp. and *Eimeria* sp. are presented in Figs. (1-6).

Table 1: Endoparasites of mugger crocodiles (*Crocodylus palustris*)

S. No.	Parasites	Snake park	Arignar Anna Zoological park	Amaravathy Crocodile farm	Mean Total
1	Renifers	13 (36.1%)	2 (4.5%)	5 (22.7%)	20 (19.6%)
2	*Ophiotaenia* sp.	3 (8.3%)	Nil	3 (13.7%)	6 (5.9%)
3	*Dujardinascaris* sp.	2 (5.6%)	16 (36.4%)	4(18.1%)	22 (21.6%)
4	*Polydelphis* sp.	Nil	Nil	3 (13.7%)	3 (2.9%)
5	*Isospora* sp.	2 (5.6%)	3 (6.8%)	Nil	5 (4.9%)
6	*Eimeria* sp.	3 (8.3%)	4(9.1%)	3 (13.7%)	10(9.8%)
7	*Isospora* sp.+ *Eimeria* sp.	3 (8.3%)	2 (4.5%)	Nil	5 (4.9%)
8	I. Renifers + *Ophiotaenia* sp.	2 (5.6%)	Nil	Nil	2 (2.0%)
	II .*Dujardinascaris* sp. + *Isospora* sp. + *Eimeria* sp.	Nil	4(11.4%)	Nil	5 (4.9%)
9	Negative cases	8 (22.2%)	12(27.3%)	4(18.1%)	24 (23.5%)
Total number of fecal samples examined		**36 (100%)**	**44 (100%)**	**22 (100%)**	**102 (100%)**

Fig. 1: Eggs of Renifers in mugger crocodile (400x)

Fig. 2: *Dujardinascaris* sp. egg of mugger crocodile (400x)

Fig. 3: *Ophiotaenia* sp. egg of mugger crocodile (400x)

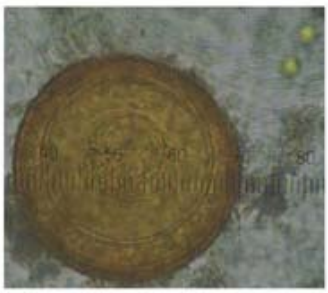


Fig. 4: *Polydelphis* sp. egg of mugger crocodile (400x)

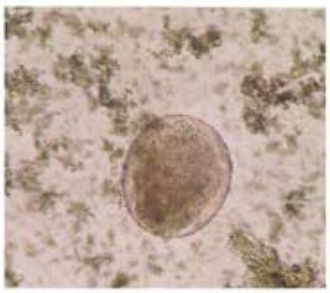


Fig. 5: *Isospora* sp. oocyst of mugger crocodile (400x)

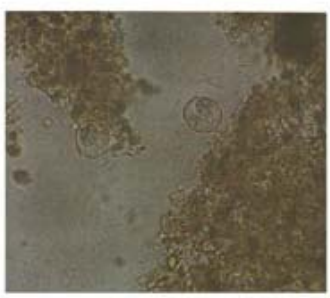
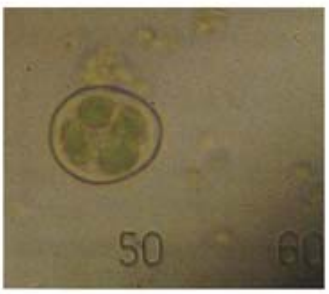


Fig. 6: *Eimeria* sp. oocyst of mugger crocodile (400x)



DISCUSSION

Endoparasites in mugger crocodiles

Examination for evidences of parasites carried out in mugger crocodiles revealed eggs of Renifers in 19.6% of the samples analyzed. The characteristic features like yellow-orange colour with a faint polar cap described (Momin *et al*., 1990) were useful for the recognition of eggs of these trematodes, Renifers. Generally, eggs of Renifers were reported in wild and captive snakes and however, the eggs had all the characteristics of the Renifers in this study.

This was supported by (Mader, 1996) who quoted that all of the flukes found in crocodilians were digenetic where the snail was the intermediate host and however. It was revealed that the life cycle of this parasite was complex, requiring one or two intermediate hosts. Fowler (1986) also stated that the Renifers were digenetic trematodes and were commonly encountered in wild and captive snakes.

Encountering of eggs of cestodes as well as with eggs of other species was supported by (Telford, 1971) who quoted that cestodes were commonly found in all groups of reptiles. Very low gastric pH of crocodiles similar to that found in sharks was assigned as the correlated factor. Fowler (1986) quoted that the order of Proteocephalidea comprised *Ophiotaenia* genus. The eggs in this study were identified by the presence of the characteristic oncospheres in fecal samples. However, no adult tapeworm was encountered during the study period in crocodiles. Reason for absence of eggs of *Ophiotaenia* sp. might be attributed to the absence of feeding of fish to crocodiles at Arignar Anna Zoological Park, Vandalur, unlike the case with Snake Park at Guindy and Amaravathy crocodile farm.

During the random collection of coprological samples from mugger crocodiles (n=102) from Arignar Anna Zoological Park, Vandalur, Snake Park, Guindy, and Amaravathy crocodile farm and subsequent analysis, it was revealed that eggs of *Dujardinascaris* sp. were recognized in majority of the fecal samples examined. Encountering the *Dujardinascaris* sp. in this study was in agreement with the findings of (Sprent, 1977) who reviewed the ascaridoid nematodes of reptiles and amphibians and the same genus was reported (Hazen *et al*., 1978; Junker and Boomker, 2006) in reptiles. In this regard, (Mader, 1996) also stated that *Dujardinascaris* and *Paratrichosoma* were the two genera that appeared to be of significance in crocodilians. (Ladds and Sims, 1990) encountered eggs of *Dujardinascaris* sp. in 41% crocodiles examined and (Goldberg *et al*., 1991) opined that crocodilians could become infected at an early age.

Oocysts of *Isospora* sp. and *Eimeria* sp. were encountered in fecal samples of crocodiles under study. Occurrence of coccidian oocysts as found in this study was in accordance with the reports provided by Momin *et al*. (1990) who quoted that *Isospora* sp. was confined to intestines, whereas *Eimeria* sp. was found in gall bladder, bile ducts and intestinal epithelium of crocodiles, in addition to lizards and snakes. However, throughout the course of this study, no symptoms were specifically reported.

Mixed parasitic infections were found to be prevalent in crocodiles of Snake Park and Zoological Park. Mixed infections might be expected to make unfavorable immuno-compromise in the severely affected crocodiles, which may have more vulnerability to diseases associated with the microbes.

Hence, periodical sampling, assessment of the degree of parasitism and monitoring the clinical signs pertaining to occurrence of parasites and appropriate deworming schedules using effective anthelminthic agents will be useful for the enrichment of management in these crocodiles.

ACKNOWLEDGEMENT

The authors are thankful to the Dean, Faculty of Basic Science, TANUVAS and Principal Chief Conservator of Forest, Saidapet, Chennai and Central Zoo Authority, INDIA for granting permission to conduct the research at Snake Park, Guindy, Chennai -06.

REFRENCES

Fowler, M.E. (1986): Zoo and Wild animal Medicine, 2nd ed., W.B.Saunders Co., Philadelphia.

Goldberg, S.R., Bursey, C.R. and Aquino-shuster, A.L. (1991): Gastric nematodes of the Paraguayan caiman, *Caiman yacare* (Alligatoridae). J. Parasitol., 77(6): 1009-1011.

Hazen, T.C., Aho, J.M., Murphy, T.M., Esch, G.W. and Schmidt, G.D. (1978): The parasitic fauna of the American alligator (*Alligator mississippiensis*) in the South Carolina. Journal of Wildlife Disease 14(4): 435-439.

Junker, K. and Boomker, J. (2006): Check-list of the pentastomid parasite in crocodilians and fresh water chelonians. Onderstepoort Journal of Veterinary Research, 73(1): 27-36.

Ladds, P.W. and Sims, L.D. (1990): Diseases of young captive crocodiles in Papua New Guinea. Aust.Vet.J., 67(9): 323-330.

Mader, D.R. (1996): Reptile Medicine and Surgery, W.B. Saunders Co., London. Pp: 185-203.

Momin, R.R., Pethkar, D.K. and Sabapura, R.H. (1990): Parasites of Reptiles. Zoos' Print Journal, 5(10): 20-24.

Rosenthal, K.L. (1997): Practical Exotic Animal Medicine. The compendium collection, New Jersey. Pp: 75.

Soulsby, E.J.L. (1982): Helminths, arthropods and protozoa of domesticated animals. 6th ed. Bailliere, Tindall and cassell Ltd., London.

Sprent, J.F.A. (1977): Ascaridoid nematodes of amphibians and reptiles: Dujardinascaris. Supplementary review article. J.Helminthol., 51: 251-285.

Telford, S.R. (1971): Parasitic diseases of Reptiles. JAVMA, 159: 1644-1652.

Urquhart, C.M., Armour, J., Duncan, J.L., Dunn, A.M. and Jennings, F.W. (1996): Veterinary Parasitology, 2nd ed., Blackwell Science Ltd., USA, Victoria, Austria. pp. 257-260.