Endoparasitic infections in free-ranging Asiatic elephants of Mudumalai and Anamalai Wildlife Sanctuary

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Abstract Free-ranging Asiatic elephants dung samples from various forest divisions of Mudumalai Wildlife Sanctuary (MWLS) and Anamalai Wildlife Sanctuary (AWLS) were examined for identification of endoparasitic infection. The dung samples revealed 100 % endoparasitic infection, with a high prevalence of *Strongyles* (64 %) in MWLS and *Anoplocephala* sp. (46 %) in AWLS. Similarly, from the same samples egg per gram of feces was done to ascertain the individual parasitic load. The present research paper communicates the high parasitic prevalence of free-ranging Asian elephants in dry seasons of (February–June 2010) MWLS and AWLS.

Keywords Free-ranging elephants · Mudumalai and Anamalai Wildlife Sanctuary · Endoparasites

Introduction

Elephants are the largest land mammals and most primeval mega herbivore with evolutionary history of more than 60 million years. The word “elephant” root in Latin is with two words “ele” meaning arch and “phant” meaning huge. In short it’s a “Huge Arch”. The world’s single largest populations of Asian elephants is seen in Nilgiris—Eastern Ghats region of southern India. Apart from captive

elephants, the wild elephant populations of southern India have been better studied and judged than those in other parts of the country. Elephants like other herbivores are susceptible to various diseases including internal parasitism. Parasitological studies provide essential data on the incidence of diseases in the selected eco-system pertaining to the wild elephants and they are susceptible to a number of ailments which are analogous to those of horses and cattle.

Methodology

The dung samples from free-ranging elephants was collected in 10 % formalin and subjected to centrifugation technique. About 2 g of dung material was placed in a 100 ml beaker and was subsequently emulsified completely with 10–15 ml of water, strained and then centrifuged. A drop of sediment was examined under microscope with both low and high power objectives (Soulsby 1982).

For EPG, one gram of dung sample was mixed with 15 ml of saturated salt solution and 1–2 glass beads were added for uniform mix. From this 0.15 ml of suspension was added to McMaster slide chamber and eggs were counted and multiplied by 100 to calculate number of eggs per gram of feces.

Result/discussion

In the present study, all together fifty dung samples were screened for the prevalence of endoparasitic infection in each free-ranging areas. The faecal samples revealed a high prevalence of *Strongyles* (64 %), *Strongyloides* sp. (16 %) and mixed infection of *Strongyles* and *Strongyloides* sp.

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Fig. 1 *Anoplocephala* **Fig. 2** *Strongyles***Table 1** Endoparasitic infections of free-ranging asian elephants

S. No.	Endoparasites	Mudumalai WLS	Anamalai WLS
1.	Strongyles	32 (64 %)	08 (16 %)
2.	<i>Strongyloides</i> sp.	08 (16 %)	07 (14 %)
3.	<i>Anoplocephala</i> sp.	Nil	23 (46 %)
4.	Strongyles + <i>Strongyloides</i> sp.	10 (20 %)	05 (10 %)
	<i>Strongyloides</i> + <i>Anoplocephala</i> sp.	Nil	07 (14 %)
	Total number of samples examined	50	50

(20 %) in Mudumalai Wildlife Sanctuary (MWLS). In Anamalai Wildlife Sanctuary (AWLS), the dung sample evaluation revealed *Anoplocephala* sp. (46 %), *Strongyles* (16 %) (Fig. 2), *Strongyloides* sp. (14 %) (Fig. 3) and mixed infection of *Strongyloides* sp. with *Anoplocephala* sp. (14 %) (Fig. 1) and *Strongyles* with *Strongyloides* sp. (10 %) (Table 1). In this regard, it becomes noteworthy to mention that Watve (1993) attributed the absence of predation and absence of other closely related species as the reasons for the occurrence of high prevalence of helminthic infections in elephants. Vidya and Sukumar (2002)

observed that some ecological factors and associated climatic conditions are responsible for various endoparasites in Asian elephants. The mean $\pm$ standard error values of egg per gram of faeces (EPG) in free-ranging elephants were estimated for parasites pertaining to Strongylosis, Strongyloidosis, Cestodiasis and mixed infections. However, statistically the values were found to be non-significant (ANOVA, using SPSS version 17.0).

Encountering the high percentage of prevalence of *Strongyles* in the dung materials (64 %) received from elephants of MWLS in this study was supported by (Raman et al. 2001) who opined that Strongylid infections were the wide spread ones among the various parasitic fauna of mega-herbivores like elephants in India and the success of survivability of the third stages larvae was mainly considered as one of the important steps in the life cycle of Strongylid nematodes in elephants. This was indirectly supported by (Arunachalam et al. 2007) who encountered only low incidence of helminthic infection among wild elephants during the rainy season. However, in the dry seasons as carried out in this study, there were lesser possibilities for the occurrence of heavy rain, which in general might assist in flushing out of the variable

Table 2 Mean $\pm$ standard error value of egg per gram of faeces in free-ranging Asian elephants

S. No.	Endoparasites	Mudumalai Wildlife Sanctuary	Anamalai Wildlife Sanctuary
1.	Strongyles	171.88 $\pm$ 25.09 NS	275 $\pm$ 64.78 NS
2.	<i>Strongyloides</i> sp.	137.5 $\pm$ 26.31 NS	171.43 $\pm$ 47.38 NS
3.	Strongyles + <i>Strongyloides</i> sp.	310 $\pm$ 43.33 NS	420 $\pm$ 58.31 NS
4.	<i>Strongyloides</i> + <i>Anoplocephala</i> sp.	0.0	385.71 $\pm$ 70.47
5.	<i>Anoplocephala</i> sp.	0.0	147.83 $\pm$ 19.75

NS non significant

Fig. 3 Strongyloides

intermediate hosts of different parasitic stages affecting these mega-herbivores (Table 2).

The high percentage of prevalence of *Anoplocephala* sp. (Fig. 1) in the dung materials (46 %) received from elephants of AWLS in this study was supported by (McAloon 2004) who reported *Anoplocephala manubriata* as the tapeworm of Asian elephants with oribatid mites in soil and substrate acting as intermediate host. In general, the contact with wild or domestic co-grazing herbivores might be the reason for the parasitization with *Anoplocephala* sp., as revealed by (Fowler and Mikota 2006).

In this regard, it was valuable to mention that the EPG of 400–1,200 was encountered in dung samples of elephants affected with Strongyles (Fig. 2) by Suresh et al. (2001) and the EPG of 1,400 was reported in elephants with Strongylosis by Rao et al. 1992. Similarly, with regard to Strongylosis in elephant, the EPG ranging from 2,325 to 3,550 was revealed during the screening of dung samples from Indian elephants with history of loose motions and

debility (Roy and Mazumdar 1988). Though different EPG values were documented in this study identification of any sick elephants in the free-ranging regions could not be done during the study and hence, correlation of the arrived EPG values with the clinical status of the free-ranging elephants could not be effectively carried out. However, in this context, Vidya and Sukumar (2002) opined about the linkage between the impoverished body condition of the elephants and the very high parasite loads (Fig. 3).

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