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## Copro-prevalence gastrointestinal parasites in *Macaca mulatta* from three mini zoo of Haryana

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### Abstract

Rhesus monkey (*Macaca mulatta*) is an endemic primate in and around to northern India. Rhesus monkey is diurnal omnivorous, feeding mainly on fruit, but also eating seeds, roots, buds, bark, and cereals. They are highly adapted to live in the wild and in human settlements and interact with humans than any other wild animal. There is a great chance for spreading zoonosis from monkeys to humans. Understanding their gastrointestinal parasites (GIP) prevalence is important, both for public health and for the health of the animals they infect. Current, study was conducted to provide baseline data on faecal parasites in rhesus monkey of Haryana state. Total 90 faecal samples were collected from three zoo of Haryana viz. Mini Zoo Pipli (MZP), Rohtak Zoo (RZ) and Mini Zoo Bhiwani (MZB). Simple flotation and sedimentation methods were used to examine fecal samples. Overall prevalence of GIP infection in rhesus monkey of Haryana was 84%. While prevalence of GIP infection in different mini zoo was 83% (MZP), 90% (RZ) and 80% (MZB). Overall prevalence of different parasite was *Strongyloides* spp (52.2%), *Trichuris* spp. (19%), *Ascaris* Spp. (8%) and *Balantidium coli* (6%).

**Keywords:** Rhesus monkey, gastrointestinal parasites, mini zoo and Haryana

### 1. Introduction

For accounting the parasitism in wildlife, one should always consider some important aspects like the effect of the parasites on the hosts, the communicable ability of parasites to domestic animals and the chances for spreading to public health. Parasites are marvelously well-adapted organisms. Their adaptations are complex since they involve intimate inter-relationship with their host, with which they co-evolved (Barnard and Behenke 1990) [2]. The result is a counter-adaptive arms race between host and parasite with far-reaching consequences on the physiology, ecology and behaviour of both (Jog and Watve 2013) [4]. Parasite richness and prevalence in wild animals can be used as indicators of population and ecosystem health (Teichroeb *et al.* 2009) [16]. Wild primates can host an incredible diversity of parasites. More than 50 different species of parasites were documented in primates (Nunn and Altizer 2006) [12]. Monkeys are the intermediate host of many parasites which have the potential to be transmitted to humans. Soil-transmitted helminths such as *Ascaris* spp., *Trichuris* spp., *Ancylostoma* spp., and *Strongyloides* spp. that can easily be transferred from NHPs to humans and vice versa through contaminated environments are a major concern (Ranglack and Yeager 1986; Bethony *et al.* 2006 and Lynn 2010) [3, 8, 13]. Current study of parasitic infection will be useful in understanding the prevalence of parasites as well as to control morbidity and mortality in rhesus monkey of the state. The study was conducted to provide basic data on GIP of rhesus monkey in Haryana.

### 2. Material and Methods

#### 2.1 Study area and different mini zoo

The present survey was done in three mini zoo of Haryana. The study took place were; Mini Zoo Pipli (MZP), Rohtak Zoo (RZ) and Mini Zoo Bhiwani (MZB).

#### 2.2 Sample collection

A total of 90 faecal samples were collected randomly from rhesus monkey (*Macaca mulatta*). The fresh faecal samples were collected in plastic sachet (size 6"x 8") and after proper labelling deposited at the Department of Veterinary Parasitology, College of Veterinary Science, LUVAS, Hisar for further parasitological examination.

#### 2.3 Faecal samples processing

All the faecal samples were screened macroscopically for the presence of parasites and/or

parasitic segments and later microscopically by direct smear examination, sedimentation, and floatation techniques (Soulsby 1982) <sup>[15]</sup> for the presence of parasitic eggs/oocysts. Based on morphological features, identified helminths ova, protozoan cyst/oocysts (Soulsby 1982) <sup>[15]</sup>.

## 2.4 Prevalence study

The prevalence of GIP was recorded according to the

different mini zoo. Percent prevalence was calculated by multiplying the total positive samples by 100 and dividing with all the samples examined.

## 2.5 Statistical analysis

The data generated were statistically analysed using IBM SPSS software (version 20). Chi-square test was applied for epidemiological investigations.

**Table 1:** Prevalence of gastrointestinal parasite infection in rhesus monkey (*Macaca mulatta*) of Haryana

Mini zoo	No. of samples		Parasite observed			
			Nematodes			Protozoa
	Examined	Positive (*)	<i>Strongyloides</i> spp.	<i>Trichuris</i> spp.	<i>Ascaris</i> spp.	<i>B. coli</i>
MZP	30	25 (83.3)	16	05	02	02
RZ	30	27 (90)	13	10	03	01
MZB	30	24 (80)	18	02	02	02
Total	90	76 (84)	47 (52.2%)	17 (19%)	07 (8%)	05 (6%)

## 3. Results

### 3.1 Prevalence of gastrointestinal parasite

Out of 90 faecal samples of rhesus monkey (*Macaca mulatta*) of Haryana was 84%; (76/90). Totally four parasite species viz. *Strongyloides* spp., *Trichuris* spp., *Ascaris* spp. and *B. coli* were identified from faecal samples. Overall prevalence and diversity of gastrointestinal parasites and their prevalence in rhesus monkey (*Macaca mulatta*) are presented in Table 1. In the rhesus macaque, faecal examination revealed high prevalence of *Strongyloides* spp (52.2%), *Trichuris* spp. (19%), *Ascaris* Spp. (8%) and *Balantidium coli* (6%).

## 4. Discussion

The overall low prevalence of parasitic infection in rhesus macaque may be due to their habit of eating tree leaf tops especially those of medicinal values, like neem tree leaves, which decrease the parasitic load in animals and contribute to the overall general health of monkeys. The above findings of low prevalence are in agreement with those of Muriki *et al.* (1998), Vardhraj and Pythal (1999) <sup>[17]</sup>, Muenne *et al.* (1998), Legesse and Arko (2004) <sup>[5]</sup> and Lilly *et al.* (2002) <sup>[6]</sup> with low prevalence. However, our results differed from Murray *et al.* (2000) <sup>[11]</sup>, Lisa *et al.* (2004), Sanchez *et al.* (2009) <sup>[14]</sup> and Ascaratte *et al.* (2010) <sup>[1]</sup>. The differences in the results may be due to the different species of monkey studied, different location of study, different climatic conditions, different age groups and varied susceptibility of monkeys to the parasites.

## 5. Conclusions

Incidence of parasitic infection was 84% Resus macaque with presence of total of four parasite species viz. *Strongyloides* spp., *Trichuris* spp., *Ascaris* spp. and *B. coli*. As per our Knowledge the parasitological infection values in rhesus macaque in Haryana reported for the first time in the current study may serve as a guideline for future studies in the same species.

## 6. Acknowledgments

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## 7. Disclosure statement

No potential conflict of interest.

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