



INCIDENCE OF GASTRO INTESTINAL PARASITES IN NILGIRITAHR (*Nilgiri tragus*) IN HABITATS ACROSS WESTERN GHATS IN KERALA

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Received : 12.12.2017

Accepted : 17.03.2018

Abstract

The Nilgiri tahr is the caprine ungulate endemic to Western Ghats and the species is endangered due to isolated small population and fragmented habitats. To study the interaction of the species with its parasites, faecal samples of the species were collected from three habitats in the Western Ghats in Kerala. The samples were collected in three seasons of summer, monsoon and post monsoon and examined by direct microscopic method, sedimentation method and floatation method. Overall incidence of parasitism was 38.9 per cent and there was significant difference between the habitats in percentage of incidence. Incidence of strongyle was the highest (34.3%) followed by coccidia (15.5%) *Capillaria*, *Moniezia*, *Trichuris* and *Strongyloides*. The incidence trend across seasons revealed a higher incidence in monsoon (58.9%), followed by that in summer (40%) and the least in post-monsoon (17.8%) with significant difference between the seasons.

Keywords : *Nilgiri tahr*, *Strongyle*, *Coccidia*, *Western Ghats*

The Nilgiri tahr is the only caprine ungulate endemic to Western Ghats and is found in 18 locations spread over six landscapes in the states of Kerala and Tamilnadu. The species is having an isolated and fragmented distribution with small population in each habitat due to its preference for grasslands adjacent to steep rocky cliffs. This localized distribution also makes them prone to parasitic infection which is also otherwise common in most of the ungulate species. An understanding about this trophic component of parasites which immediately interact with the species is important in the long term conservation of this endangered species. Though wild animals particularly ungulates harbour a wide range of parasites, they seldom lead to harmful infection unless the host animal is stressed (Gaur *et al.*, 1979).

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Incidence of gastro-intestinal parasites in wild animals including Nilgiri tahr from the Western Ghat landscape have been earlier reported by Saseendran *et al.* (2003) and Ravindran *et al.* (2011). Helminth infection in captive tahr was reported by Varadharajan and Pythal (1999). A high incidence (97%) of helminth parasites has been reported by Fritsche *et al.* (1993) in small ruminants in Gambia, and all these studies underline the significant presence of parasites in both wild and domestic small ruminants. The present study investigates the incidence of gastro intestinal parasites in Nilgiri tahr and its seasonal changes across three habitats in Western Ghats.

Materials and Methods

The study was conducted in the three habitats namely, Kochupamba in Periyar Tiger Reserve, Nelliampathi in Nenmara Forest Division and Pettimudi in Eravikulam National Park during the three seasons of summer (February to May), monsoon (June to September) and post monsoon (October to January). The herd of animals in each habitat was observed during the activity time without interruption and then the area was scanned for faecal pellets. About 20 g of fresh faecal pellets were collected from individual clumps of pellets ensuring collection of a single sample from a clump. The samples were examined for ova or oocysts of parasites by direct microscopic method, sedimentation method and floatation method (Soulsby, 1982).

Results and discussion

The overall incidence of parasitism was 38.9 per cent among the total samples (n=265)

collected in the different habitats and seasons. On comparing the parasitic incidence between habitats, a significant difference between the habitats was evident with Nelliampathi having highest incidence (53.4%) followed by Eravikulam (39.1%) and Kochupamba (21.9%) (Table 1).

The overall incidence of parasites (38.9%) and the highest incidence among the habitats from Nelliampathi (53.4%) indicated a comparatively lower incidence of parasitism during this study period when compared to Saseendran *et al.* (2003) who reported 75 percent incidence of strongyles in Nilgiri tahr at Eravikulam. The higher incidence reported by Saseendran *et al.* (2003) might be due to the fact that sample collection was from the tourism zone of the habitat which was a disturbed location with more aggregation of the animals. In free ranging elk population 48.7 per cent incidence of parasites was reported (Hines *et al.*, 2007) which is similar to the incidence noticed in the present study, particularly in Nelliampathi. This denotes the change in parasitic incidence based on habitat features and the climatic conditions in that zone.

Analysis of the incidence of the different types of parasite (Table 2) clearly showed that strongylosis was the major parasitism (34.3%) followed by coccidiosis (15.5%) occurring across all habitats. Ova of *Moniezia*, *Trichuris* and *Strongyloides* species were reported only from Nelliampathi, while *Capillaria* occurred in Nelliampathi and Eravikulam with higher incidence in the latter. There was significant difference in incidence of strongyle and coccidia between the habitats.

Table 1. Incidence of parasites in different habitats

Parasitism status	Eravikulam		Nelliampathi		Kochupamba		Total	
	Count	Per cent	Count	Per cent	Count	Per cent	Count	Per cent
Negative	78	60.9	34	46.6	50	78.1	162	61.1
Positive	50	39.1	39	53.4	14	21.9	103	38.9
Total	128	100.0	73	100.0	64	100.0	265	100.0

Chi square = 14.290** p-value < 0.001

** Significant at 0.01 level

The incidence of strongylosis and coccidiosis was much lower in comparison to Ezenwa (2004) who has reported a higher incidence of strongyle (88-100%) and coccidia (50-95%) in impala which might be due to the habitat changes of the two species. Besides *Strongyloides* spp. and *Moniezia* spp. were also reported in the study. Archie and Ezenwa (2011) also had reported gastro-intestinal nematodes from over 60 percent samples collected. *Strongyloides* also has been reported from Nilgiri tahr by Ravindran *et al.* (2011) from Periyar Tiger Reserve which is a habitat in this study. However, we have not obtained any

evidence of *Strongyloides* infection from that habitat.

In observing the incidence trend across seasons, higher incidence was observed in monsoon (58.9%), followed by summer (40%) and least in post-monsoon (17.8%), with significant difference between the seasons, and the results are given in table 3.

In comparing the incidence of different type of parasites across the different seasons significant difference was observed between strongyle with highest incidence

Table 2. Incidence of different parasites in the habitats

Type of parasite	Eravikulam		Nelliampathi		Kochupamba		Total	
	Count	Per cent	Count	Per cent	Count	Per cent	Count	Per cent
<i>Moniezia</i>	0	0	4	4.4	0	0	4	1.5
<i>Coccidia</i> #1	21	16.4	18	24.7	2	3.1	41	15.5
<i>Trichuris</i>	0	0	1	1.1	0	0	1	0.4
<i>Capillaria</i>	5	5.9	1	1.4	0	0	6	2.3
<i>Strongyloides</i>	0	0	1	1.4	0	0	1	0.4
<i>Strongyle</i> #2	41	32.0	37	50.7	13	20.3	91	34.3

#1 (Chi square = 12.256** p-value = 0.002)

#2 (Chi square = 14.537** p-value < 0.001)** Significant at 0.01 level

Table 3. Total parasitic incidence in different seasons

Parasitism status	Summer		Monsoon		Post monsoon		Total	
	Count	Per cent	Count	Per cent	Count	Per cent	Count	Per cent
Negative	51	60.0	37	41.1	74	82.2	162	61.1
Positive	34	40.0	53	58.9	16	17.8	103	38.9
Total	85	100.0	90	100.0	90	100.0	265	100.0

Chi square = 32.076** p-value < 0.001

** Significant at 0.01 level

Table 4. Incidence of different parasites in different season

Type of parasite	Summer		Monsoon		Post monsoon		Total	
	Count	Per cent	Count	Per cent	Count	Per cent	Count	Per cent
<i>Moniezia</i>	0	0	4	4.4	0	0	4	1.5
<i>Coccidia</i>	20	23.5	21	23.3	0	0	41	15.5
<i>Trichuris</i>	0	0	1	1.1	0	0	1	0.4
<i>Capillaria</i>	5	5.9	0	0	1	1.1	6	2.3
<i>Strongyloides</i>	1	1.2	0	0	0	0	1	0.4
<i>Strongyle</i> *	28	32.9	47	52.2	16	17.8	91	34.3

* (Chi square = 23.787** p-value < 0.001)** Significant at 0.01 level

during monsoon (52.2%) followed by summer (32.9%) and lowest in post monsoon (17.8%). In coccidia there was no significant difference between summer and monsoon while there was no incidence in post monsoon. The results of incidence of different parasites in the three seasons are given in table 4.

The significant difference between incidences of parasites across seasons was mainly evident in case of strongyles in the study. Fritsche *et al.* (1993) also have reported certain strongyle species to peak in mid dry season and some others with distinct peaks in the rainy season. The seasonal trends in parasitic incidence and infection rate also have been reported by El-Azazy (1995) in sheep and goats; Halvorsen and Bye (1999) in rein deer; Theodoropoulos *et al.* (2000) in sheep; Hrabok *et al.* (2006) in semi-domestic reindeer; Bam *et al.* (2012) in yaks; and Vadlejch *et al.* (2015) in a herd of elands. Seasonal trends of parasitic infection was observed with bimodal rainfall pattern by Sissay *et al.* (2007) with higher levels of infection during the short and long rain seasons, and the bimodal rainfall pattern in the habitats of present study may have an important influence in the incidence of parasites.

The study signifies the presence of parasites in Nilgiri tahr and the higher prevalence of strongyles and coccidia in the species similar to that in other ungulates. The seasons and the weather patterns in the habitat distinctly influenced the parasitic incidence in the species.

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