Full Length Article

GASTRO-INTESTINAL PARASITES IN WILD CARNIVORES OF WESTERN GHATS OF TAMIL NADU

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ABSTRACT

Western Ghats is a hotspot of biodiversity with different species of carnivores. The gastrointestinal parasites prevailing among free-ranging carnivores were documented by examination of forty-three (N=43) faecal samples collected in selected regions of Western ghats by perambulation from February to September, 2025. The study revealed an overall percentage of endoparasitic infection of about 60.46% (n=26). The percentage of infection of gastrointestinal parasites in tiger (n=13), leopard (n=17), dhole (n=8) and golden jackal (n=5) were 38.46%, 76.47%, 75.00% and 40.00% respectively. Toxocara spp. and Taenia sp. were documented in all four carnivore species, whereas Diphyllobothrium sp. eggs were recorded only in leopards. Trichuris sp.and Sarcocystis sporocyst were detected only in tiger samples. Strongyle eggs were recorded only in leopards and dholes.

Key words: Gastrointestinal parasites, free-ranging carnivores, Western Ghats

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INTRODUCTION

Western Ghats is a chain of mountains running parallel to Western coast of peninsular India from Gujarat to Southern tip of Indian peninsula. Western Ghats is the hotspot of biodiversity and endemism. Western Ghats inhabits at least 325 globally threatened (IUCN Red data list) species (Report, 2025). It has one of the largest tiger (*Panthera tigris*) and dhole (*Cuon alpinus*) populations in India, contributing about approximately 30% of wild tiger population of India. Western Ghats is also habitat for other important carnivores such as leopard (*Panthera pardus*), golden jackal (*Canis aureus*) and sloth bear (*Melursus ursinus*). Western Ghats is a region of endemic heritage with its flagship endemic species Nilgiri tahr (*Nilgiritragus hylocrius*) inhabiting the southern stretch.

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Endoparasites are naturally present in free-ranging wildlife population and have a significant impact on wildlife. Hence, a thorough understanding of the sylvatic cycle is critical for conservation of endangered species. Wild felids such as tigers and leopards play a major role in the transmission of certain helminth infections to prey species, which can act as intermediate hosts (Chhabra and Pathak, 2013). The gastrointestinal parasites of free-ranging wild felids may play a significant part in the sylvatic prey-predator cycle, thus indirectly impacting the health of other animals, especially ungulates. Such studies on free-ranging carnivores are scarce and hardly any data exists of the gastrointestinal parasites (GI) of free ranging carnivores in India. Thus, conservation aspect of wildlife could change with better understanding of prevailing parasitic diseases and its implications.

MATERIALS AND METHODS

The study was conducted by collecting faecal samples identified to be that of tigers and leopards from the selected regions along the Western Ghats from February 2025 to September 2025. Prior permission was obtained from the Forest Department for carrying out the research work. A total of forty-three free-ranging carnivore samples were collected comprising 13 samples of tiger, 17 samples of leopard, 8 samples of dhole and 5 samples of golden jackal (Table 1).

The samples were collected from various regions along the Western Ghats. The study area included, Western Catchment, Mukurthi, Gudalur O'Valley, Anamalai Tiger Reserve (ATR), Srivilliputhur-Meghamalai Tiger Reserve (SMTR), Kalakkad-Mundhanthurai Tiger Reserve (KMTR), Tirunelveli Forest division and Kanyakumari Wildlife Sanctuary (Figure 1).

About 25 grams of faecal samples identified to be that of carnivores through scat morphometry (Chame, 2003), were collected during perambulation in a clean zip lock bags, labeled, sealed tight excluding air and transported in an ice box with gel packs and stored in 4ºC.

The samples were subjected to qualitative parasitological examinations such as direct smear method, sedimentation technique and Willi's flotation technique as per standard techniques (Soulsby, 1982) to assess the presence of helminth. The parasites were identified as per Soulsby (1982) and morphology of egg alongwith the morphometry was documented.

RESULTS AND DISCUSSION

The overall incidence of gastrointestinal parasitic infection in wild carnivores was 60.46% (N=26).

Tigers

Four samples in Western Catchment and one sample from Mukurthi were positive resulting in overall 38.46% (n=5) of gastrointestinal parasite infection. Of the five positive samples, two samples (40.00%) were documented with single infection of *Toxocara spp*. and *Trichuris sp*.

eggs respectively. Three (60.00%) positive samples were with mixed infection of *Toxocara* spp., *Taenia* sp. and *Sarcocystis* sporocysts. (Table 2, Figure 2).

The results concur with Jeeva *et al*. (2025) documenting the presence of ascarids namely *Toxocara cati* and *Toxascaris* sp. The observations also aligned with findings of Maharjan *et al.* (2025) study on prevailing parasites of free-ranging tigers in Nepal revealing infection with *Toxocara* sp. (9.5%), *Trichuris* sp. (3.1%) and *Taenia* sp. (1.5%). The findings were also in accordance with Amarilis *et al.* (2023) report on prevalence of *Toxocara* sp. (25%) and *Trichuris* sp. (25%) in wild Sumatran tigers (*Panthera tigris sumatrae*). Similarly, the results were correlating with findings of Seryodkin *et al.* (2023) highlighting the presence of *Toxocara cati* (65%) and *Taenia* sp. (3.9%) in free-ranging Siberian tigers. The findings were in concordance with Moskvina *et al.* (2018) findings on prevalence of *Toxocara cati* (72.5%) in free-ranging Siberian tigers *(Panthera tigris altaica*).

The findings on prevailing gastrointestinal strongyle parasites correlated with findings of Arjun *et al.* (2017) on prevalence of endoparasites in free-ranging tigers of Wayanad wildlife sanctuary highlighting the prevalence of *Toxocara* sp. (3.33%), *Taenia* sp. (10%) and *Trichuris* sp. (3.33%) but also contradict the findings of *Paragonimus westermanii* (54.3%) and *Spirometra* sp. (71.7%). The findings agreed with report of Kolangath *et al.* (2025) on documentation of *Sarcocystis* sp. in free-ranging tigers of Maharashtra highlighting asymptomatic infection of *Sarcocystis* to be the common parasite affecting the wild carnivores. The findings on less overall occurrence of gastrointestinal parasites in tigers might be the result of seasonal variation, where the prevalence is higher during the monsoon season.

Leopards

Six samples from KMTR, three samples from Kanyakumari Wildlife Sanctuary and one sample each from ATR, SMTR, Tirunelveli Forest Division, and Dindugul Forest Division, were confirmed for the presence of gastrointestinal parasites [76.47%, n=13]. Ten samples (76.92 %) with single infection and three samples (23.07 %) with mixed infection were recorded. Among the single infection samples, eight samples [61.53%] revealed the presence of *Toxocara* spp. eggs, one sample [7.69%] was positive for *Toxascaris* sp. and another sample [7.69%] was positive for strongyle. Among the mixed infection samples one sample each was positive for *Taenia* sp. and *Toxocara* spp., *Toxocara* spp. and strongyle and *Toxocara* spp. and *Diphyllobothrium* sp. (Table 2, Figure 3)

The high occurrence of *Toxocara* spp. in findings was in correspondence with reports of Shirbhate and Shirbhate (2019) highlighting the prevalence of *Toxocara* sp. (61.53%), *Toxascaris* sp. (53.84%), *Taenia* sp. (20.07%) and *Ancylostoma* sp. (19.23%) in free-ranging leopards in India. The findings were in alignment with Jeeva *et al*. (2025) study on necropsy findings of ascarids worms (18.75%) *Toxocara* sp. and *Toxascaris* sp. in free-ranging leopards. The findings were in accordance with

Kolangath *et al*. (2025) report on prevalence of *Toxocara* sp. and *Diphyllobothrium* sp. in free-ranging leopards. The results were in correspondence with Kakooei *et al*. (2021) report on presence of *Toxascaris* sp. in free-ranging Persian leopard (*Panthera pardus tulliana*), Seryodkin *et al*. (2023) findings highlighting the prevalence of Strongyle (20%) in free-ranging Amur leopard (*Panthera pardus orientalis*) and Schieber and Štrkolcová (2019) report on prevalence of *Toxocara* cati and *Ancylostoma* sp. in captive snow leopard (*Panthera uncia*). *Toxocara* species eggs are generally shed in the faeces of young animals of less 6 months old. However, the high level of occurrence of *Toxocara* species eggs in the faeces of wild felids suggests an altered life cycle pattern of ascarid parasites in wild felids which could be attributed to relaxed immunity, endocrinologic perturbations, immune disorders or stress (Nijsse *et al*., 2016). A study in Netherlands suggest domesticated cats contribute the most to the environmental contamination with *Toxocara* eggs by non-juvenile hosts in, although dogs took over as the main contributors (Nijsse *et al*., 2015).

Dholes

Two samples from Western catchment and four samples from ATR were positive for gastrointestinal endoparasites (75.00%). Of the six positive samples, five samples (62.50%) had single infection and one sample (12.5%) revealed mixed infection. In samples with single infection three samples (50.00%) revealed the presence of *Toxocara* spp. and two samples (33.33%) were positive for *Taenia* sp. one sample (16.66%) had mixed infection with *Toxocara* spp. and *Strongyle* (Table 2, Figure 4).

The findings were in strong correspondence with the recordings of Kolangath *et al*. (2025) highlighting the prevalence of *Toxocara* sp. and Taenia sp. in free-ranging dholes. The findings concur with necropsy report of Jeeva *et al*. (2025) on presence of *Taenia* sp. in free-ranging dholes. The findings were in accordance with the report of Manjunatha *et al*. (2019) on the prevalence of *Toxocara* sp. (50%) in captive dholes. The findings support those of Devaki *et al*. (2006) and Muraleedharan (2016) report on prevalence of *Ancylostoma caninum* in dholes. However, the findings do not concur with previous study of Schieber and Štrkolcová (2019) on prevalence of *Sarcocystis* sp. in captive dholes.

Golden jackals

Two (40.00%) of five samples collected from Western catchment were positive for gastrointestinal parasites. Of the two positive samples, 50.00% (n=1) had a single infection with *Toxocara* sp. and 50.00% (n=1) had a single infection with *Taenia* sp. No mixed infection was detected in the two positive samples. (Table 2, Figure 5).

The findings were in correspondence with Sheikh *et al.* (2023) study on prevalence of *Toxocara canis* (22.86%) and *Taenia* sp. (13.65%) in free-ranging jackals. Similarly, the findings support the report Jannat *et al.* (2020) on prevalence of *Toxocara* sp. (83.33%) and *Taenia* sp. (36.67%) in jackals.

Golden jackals as a member of wild canids, naturally act as a definitive host for variety of helminths including *Taenia* sp. and *Toxocara* sp. The findings were in concurrence with report of Holland (2023) on high prevalence of *Toxocara* sp. in jackals. The findings were in accordance with Singh (2019) and Manjunatha *et al*. (2019) study on prevalence of *Strongyle* (50%) in captive jackals. Similarly, the findings corresponded with those of Javaregowda (2016) on mixed infection of *Toxocara* sp. and *Strongyle* in captive jackals. The findings also support the review of Muraleedharan (2016) and Thawait *et al*. (2014) on diverse prevalence of *Toxocara* sp. and *Taenia* sp.

CONCLUSION

The present data records the prevalence of gastrointestinal parasites of free ranging wild carnivores of various regions along the Western Ghats, Tamil Nadu, India. The data gathered in this study would provide insight on parasite sylvatic cycle and the implication of carnivore parasite on other co-existing herbivores, especially ungulates.

Table.1. Faecal samples of free-ranging carnivores collected from various regions of Western Ghats

S. No.	Location	Tiger	Leopard	Dhole	Golden jackal
1.	Gudalur, O'Valley	1	-	-	-
2.	Western Catchment	8	-	2	5
3.	Mukurthi	1	1	-	-
4.	Anamalai Tiger Reserve	-	1	4	-
5.	Srivilliputhur-Meghamalai Tiger Reserve	2	1	-	-
6.	Kalakkad Mundandhurai Tiger Reserve	-	7	-	-
7.	Tirunelveli Forest Division	-	1	2	-
8.	Kanyakumari Wildlife Sanctuary	1	5	-	-
9.	Dindugul Forest Division	-	1	-	-
	Total	13	17	8	5

Table.2. Parasites identified faecal samples of free-ranging carnivores from various regions of Western Ghats

	Positive					Total
	Single infection					
	Taenia sp.	*Toxocara* spp.	*Toxascaris* sp.	*Strongyle*	*Trichuris* sp.	
Tiger	-	1	-	-	1	**2**
Leopard	-	8	1	1	-	**10**
Dhole	2	3	-	-	-	**5**
Golden Jackal	1	1	-	-	-	**2**
	Mixed infection					
	Toxocara spp. and *Taenia* sp.	*Taenia* sp. and *protozoa*	*Toxocara* spp. and *Strongyle*	*Toxocara* spp. and *Diphyllobothrium* sp.	*Strongyle* and *Strongyloides* sp.	
Tiger	2	1	-	-	-	**3**
Leopard	1	-	1	1	-	**3**
Dhole	-	-	1	-	-	**1**
Golden Jackal	-	-	-	-	-	**-**
Total						**26**

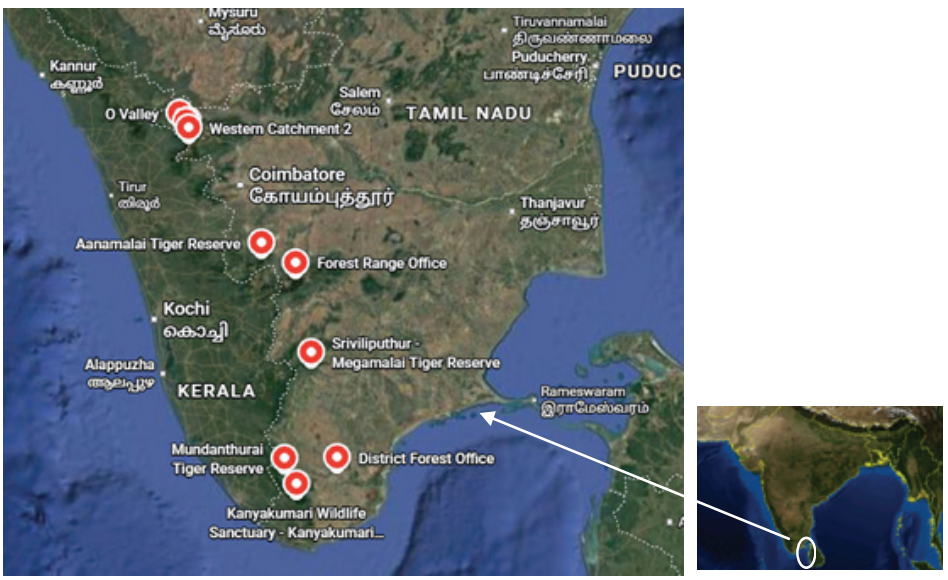

Fig.1. Map showing the locations from where faecal samples were collected

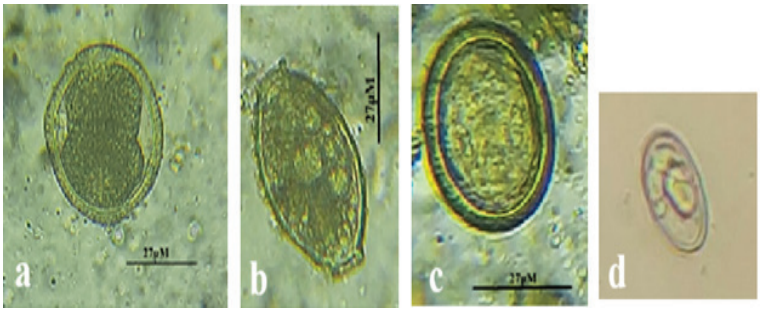

Fig.2. Ova of parasites identified in free-ranging tigers showing *Toxocara* sp. (a), *Trichuris* sp. (b), *Taenia* sp. (c) and *Sarcocystis* sporocyst (d)

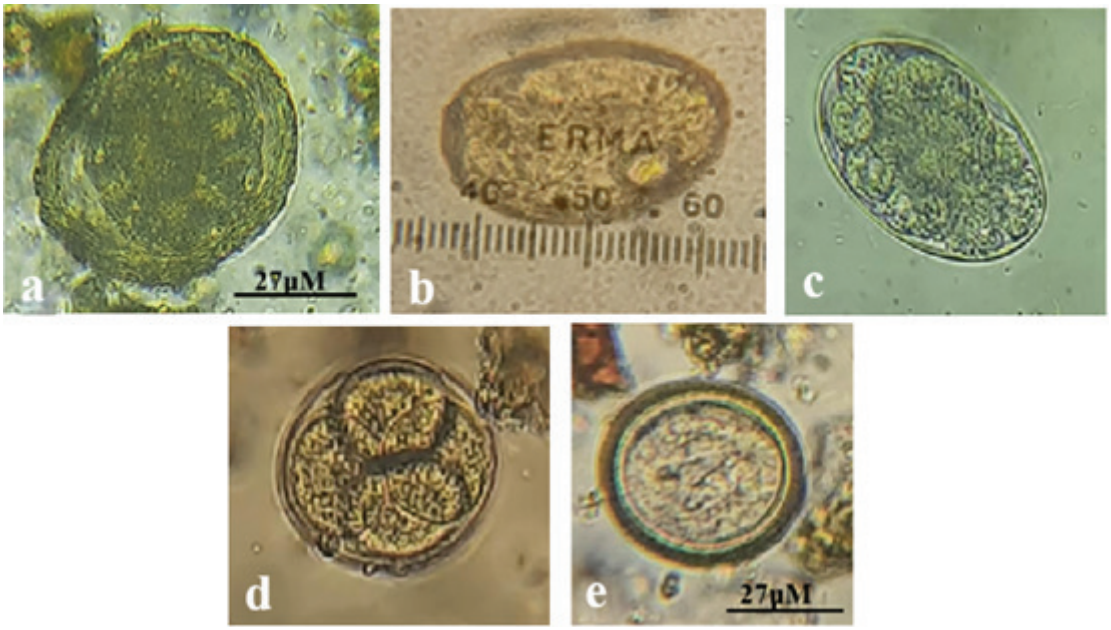

Fig.3. Ova of parasites identified in free-ranging leopards showing *Toxocara* spp. (a), *Diphyllobothrium* sp. (b), *Strongyle* (c), *Toxascaris* sp. (d) and *Taenia* sp. (e)

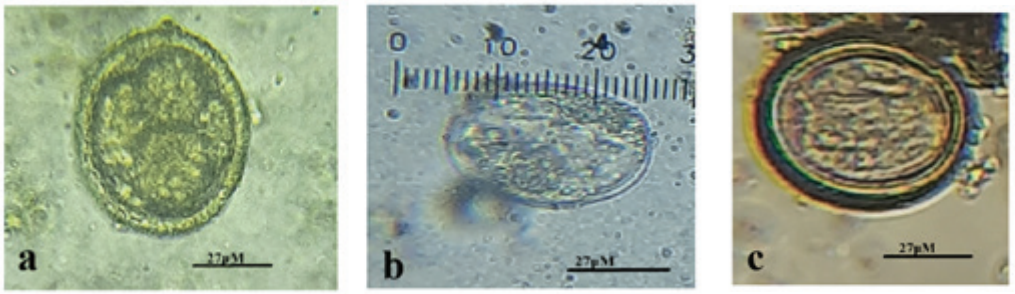

Fig.4. Ova of helminth parasites identified in scat of free-ranging dholes showing *Toxocara* spp. (a), *Strongyle* (b) and *Taenia* sp. (c)

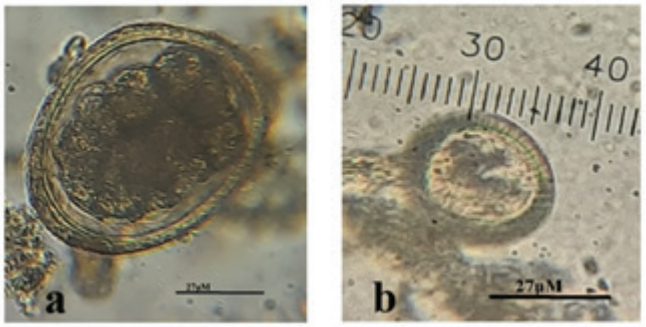

Fig.5. Ova of helminth parasites identified in scat of free-ranging golden jackals showing *Toxocara* spp. (a) and *Taenia* sp. (b)

REFERENCES

Amarilis, K., Suandika, P., Ahmadi, M., Sianipar, D.H.A., Nurcahyo, R.W. and Indarjulianto, S. (2023). Retrospective study of helminthiasis in wild Sumatran tiger (*Panthera tigris sumatrae*) rescued by Dharmasraya Sumatran Tiger Rehabilitation Center. In IOP *Conference Series: Earth and Environmental Science* (Vol. *1174*, No. 1, p. 012026). IOP Publishing.

Arjun, M.S., Ravindran, R., Zachariah, A., Ashokkumar, M., Varghese, A., Deepa, C.K. and Chandy, G. (2017). Gastrointestinal parasites of tigers (*Panthera tigris tigris*) in Wayanad wildlife sanctuary, Kerala, India. *International Journal of Current Microbiology and Applied Sciences*, **6**(8): 2502-2509.

Chame, M. (2003). Terrestrial mammal feces: a morphometric summary and description. *Memórias do Instituto Oswaldo Cruz*, **98**: 71-94.

Chhabra, M.B. and Pathak, K.M.L. (2013). Parasites and parasitic diseases of wildlife in India. 2. Carnivores and birds. *Indian Journal of Animal Sciences*, **83**(6): 567-578.

Devaki, K., Senthilkumar, K., Nasrullahkhan, P. and Jayathangaraj, M.G. (2006). Ancylostomiasis in dhole (*Cuon alpinus*). *Zoos' Print Journal*, **21**(1): 2141-2142.

Holland, C.V. (2023). A walk on the wild side: A review of the epidemiology of *Toxocara canis* and *Toxocara cati* in wild hosts. *International Journal of Parasitology Parasites and Wildlife*, **22**: 216-228.

Jannat, R.,Khanum, H., Zaman, R.F., Musa, S. andMukutmoni, M.(2020). Enteric parasites with zoonotic importance in jackal. *National Journal of Life Sciences*, **17**(2): 81-86.

Javaregowda, A.K. (2016). Studies on prevalence of endo-parasitic infection in wild carnivores maintained under

captive state. *Journal of Parasitic Diseaes*, **40**(4): 1155-1158.

Jeeva, K., Aravind, M., Rajesh Kumar, K., Bino Sundar, S.T. and Richard Jagatheesan, P.N. (2025). Occurrence of ascarid infection in wild felines across different forest ranges in the Nilgiris, Tamil Nadu, India. *Journal of Veterinary and Animal Sciences*, **56**(2): 353-362.

Kakooei, Z., Mowlavi, G., Mobedi, I., Zarei, Z. and Zahabiun, F. (2021). Tracking of toxocariasis in *Panthera pardus saxicolor*, the endangered feline species in the wildlife of Northwestern Iran. *Iranian Journal of Public Health*, **50**(9), p.1922.

Kolangath, S.M., Upadhye, S.V, Pawshe, M.D., Shalini, A.S., Dhoot, V.M. and Bhangale, P.K. (2025). Parasitic profiling of tigers and leopards of Maharashtra. *International Journal of Veterinary Science and Animal Husbandry*, **10**(3): 42-46.

Maharjan, B., Jain, P. and Koju, N.P. (2025). Zoonotic risks and conservation challenges: gastrointestinal parasites in wild mammals of Chitwan National Park, Nepal. *International Journal of Parasitology Parasites and Wildlife*, **26**, p.101041.

Manjunatha, V.,Rout, M., Salian, N., Kshama, L.M., Sreevatsava, V., Umashankar, K.S. and Byregowda, S.M. (2019). Copro-ovoscopical assessment of gastrointestinal parasitism in captive canine and feline carnivorans. *Indian Journal of Animal Research*, **9**(1): 209-214.

Moskvina, T.V., Schelkanov,M.Y., and Begun,M.A. (2018). Endoparasites of the Siberian tiger (*Panthera tigris altaica*). *Integrative Zoology*, **13**(5): 507-516.

Muraleedharan, K. (2016). Endoparasites of wildlife (carnivores) of Karnataka state, India-an overview. *Veterinary Research*, **4**: 54-56.

Nijsse, R., Mughini-Gras, L., Wagenaar, J.A., Franssen, F. and Ploeger, H.W. (2015). Environmental contamination with Toxocara eggs: a quantitative approach to estimate the relative contributions of dogs, cats and foxes, and to assess the efficacy of advised interventions in dogs. *Parasites and Vectors*, **8**(1), p.397.

Nijsse, R., Mughini-Gras, L., Wagenaar, J.A., Ploeger, H.W. (2016). Recurrent patent infections with *Toxocara canis* in household dogs older than six months: a prospective study. *Parasites and Vectors*, **9**(1):531.

Report,2025. Western Ghats-UNESCO World Heritage Centre https://whc.unesco.org/en/list/1342// retrieved on 17.09.2025

Schieber, M.C. and Štrkolcová,G. (2019). Prevalence of endoparasites in

carnivores in a zoo and a wolves park in Germany. *Folia Veterinaria*, **63**(1): 54-59.

Seryodkin, I.V., Kurnosova, O.P., Khrustalev, A.V., Esaulova, N.V., Varlamova, A.I. and Odoevskaya, I.M. (2023). Helminth zoonoses of wild carnivore mammals in the Primorsky Krai of the Russian Far East. *Rusian Journal of Parasitology*, **17**(4): 443-452.

Sheikh, M.M., Tak, H., Fazili, M.F. and Wani, I.N. (2023). A coprological survey on helminths of Jackal *Canis aureus Linnaeus* 1758 in Kashmir Himalaya. *Journal of Parasitic Diseases*, **47**(3): 491-500.

Shirbhate, M. and Shirbhate, A. (2019). The prevalence of gastrointestinal parasites in *Panthera pardus* of Katepurna Wildlife Sanctuary, Akola India. *Environment Conservation Journal*, **20**(3): 131-134.

Singh, R.P. (2019). Clinico-therapeutic study of ectoparasitic and gut-inhabiting endoparasitic infections of zoo carnivores (Doctoral dissertation, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana). pp:26-60.

Soulsby, E.J.L. (1982) Helminths, Arthropods and Protozoa of Domesticated Animals, 7thEdn. Bailliere and Tindall, London

Thawait, V.K., Maiti, S.K. and Aditi A. Dixit. (2014). Prevalence of gastro-intestinal parasites in captive wild animals of Nandan Van Zoo, Raipur, Chattisgarh. *Veterinary World,* **7**(7): 448-451.