SEASONAL EFFECT ON THE PREVALENCE OF PARASITIC ZOONOTIC DISEASES AMONG ZOO ANIMALS OF BIHAR

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ABSTRACT

Seasonal influence on the parasitic infection in both herbivorous and carnivorous animals showed that the maximun percentage of infection was observed in monsoon season and minimum in summer. Cent per cent parasitic infection was observed in elephant, capped langur, golden cat and wolf. All other zoo animals showed the infection rate varying from 12.5 to 75 %. The influence of seasonal prevalence was more pronounced in case of rhinoceros on spotted deer, golden langoor, monkey, tiger, clouded leopard, leopard cat and bear.

INTRODUCTION

The spectrum of parasitic diseases in wild animals is of great importance both to human and veterinary medicine. The wild animals and their domestic counterparts suffer from ill effects of a wide variety of helminths and protozoa. Under captivity the health status of the zoo animals varies on different factors such as management, feeding, sanitation and seasonal variation. A higher seasonal prevalence of various parasites during rainy and winter seasons has been reported by Chauhan *et al.* (1973).

The present study was an attempt to record the effect of different season on the prevalence of different endoparasites in Zoo animals of Bihar.

MATERIAL AND METHOD

Zoo animals (105 herbivores and 80 carnivores) belonging to Sanjay Gandhi Biological Park (SGBP), Patna and Jawahar Lal Nehru Biological Park (JNBP), Bokaro Steel City served as materials for this present investigation. The prevalence of parasitic infections recorded during various months of the year (1992-1993) has been pooled together for presentation into four seasons i.e. monsoon (August, September and October), winter (November, December and January), spring (February, March and April) and summer (May, June and July). As informed by zoo authorities, it is customary to do routine deworming.

The sample of each animal was collected from their individual cage. Fresh faecal samples were collected. Sufficient care was taken to have the middle portion of fresh faecal sample with the clean, sterile wooden stick into a clean, sterile small plastic vials to keep awary extraneous material from soil. The container was filled to its capacity and was tightened as close to the faeces to avoid the developing and hatching of eggs. The vials were properly labelled and brought to laboratory within an hour of collection. The examination of faecal samples were done for different helminthic ova and protozoal cysts by conventional methods. The prevalence of different parasitic infections among zoo animals were worked out and was statistically analysed.

RESULTS

The results revealed that 46.67 % of the herbivores to be positive for parasitic infection whereas 50 % carnivorous animals were found infected with parasitic diseases. The overall infection rate of parasites among zoo animals of Bihar was found to be 48.11 %.

The result of seasonal influence on the parasitic load in both herbivorous and carnivorous animals (Table 1) showed that maximum percentage of infection was observed during monsoon in both herbivores (46.59%) and carnivores (49.29%) and minimum in summer season (herbivores 41.93% and carnivores 33.33%).

The percentage occurrence of parasitic infection in different species of herbivorous animals at different seasons has been presented in Table 2. From this table, it appears that in all the season 100% infection was observed in all elephant and capped langur. Hippopotamus and gibbons were found negative for any parasitic infection during the whole year. Apart from this, the rhinoceros, mithun and golden langur as well as common langur showed the infecton rate above 50% in most part of the year. Surprisingly, the herbivorous animals i.e. nilgai, black buck and sambar maintained on range pastures, showed such less rate of infection as compared to other herbivorous animals. From the analysis of the results obtained, there appears to be no different pattern of the seasonal influence on parasitic infection in this group of animals (Table 2).

Table 1. Seasonal influence on the prevalence of parasitic infection of zoo animals of Bihar.

Group of animal	Season	No. of animal examined	No. of animal found +ve	% of infection	Value of X^2 3 d.f.
Herbivores	Monsoon	88	41	46.59	
	Winter	95	41	43.16	
	Spring	90	38	42.22	
	Summer	93	39	41.93	
		366	159	43.44	0.499
Carnivores	Monsoon	71	35	49.29	
	Winter	72	35	48.61	
	Spring	76	32	42.10	
	Summer	69	23	33.33	
		288	125	43.40	4.699

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The picture of parasitic infection in carnivorous animals (Table 3) showed that the single wolf and golden cat maintained at the zoo were found infected with parasitic worms. On the contrary, the jungle cat and khatas were found negative for any parasitic infection. All other categories of carnivorous animals showed infection rate varying from 20% (in case of hyaena) to 61.53 % (in clouded leopard). The seasonal prevalence were more pronounced in case of tiger, leopard, fishing cat and bear. However, lion, leopard cat and Indian fox showed 30.30, 40.74 and 36.36% infection respectively.

DISCUSSION

Many wildlife species are now known potential reservoirs of infectious and parasitic agents which are harmful to man and livestock (Zoonosis) (Pathak, 1991). On the basis of available literature it can also be judged that the parasitic infestation causes considerable losses of wildlife in this country (Srivastava and Pandey, 1965, Arora and Das, 1988, Dutta *et al.*, 1990) in the present investigation. The effect of season on the prevalence of parasitic Zoonosis occurring in a number of important wild animals maintained under captivity in India is scanty, however, the present observations will serve as an adjunct to the previous findings.

Seasonwise prevalence of parasitic infection in various species of herbivorous animals was higher in all the seasons i.e. monsoon, winter, spring and summer season as compared to carnivorous animals (Table 1). Statistical analysis revealed no significant effect of season on the prevalence of parasites both in herbivourous and carnivorous animal (X^2 = 0.499 and 4.699 at 3 d.f., respectively). A number of speceis e.g. elephant and capped langur maintained at the zoo showed 100% infection throughout the year (Table 2). In contrast to this, among the carnivorous animals 100% infection was found only in Golden Cat (Table 3). The infection rate was found to be constant throughout the year in both herbivorous and carnivorous animals (Tables 2&3). It is evident from Table-2 that statistically the season has no significant effect on the prevalence of parasitic infection. However, the highest percentage of infection in rhinoceros, mithun, black buck and spotted deer was found more in monsoon, whereas in sambar and golden langoor it was in winter and in monkey in summer. In nilgai in both spring and summer, infection rate was higher. Chauhan *et al.* (1973) observed higher prevalence of parasitic infection during rainy and winter season where as the peak figures for taenids occured in autumn and in non-taenids it was in winter (Coman, 1973).

No significant relation were found among different species of carnivores, maintained at the zoo, except that the infection was lowest during summer season in almost all the categories of wild animals (Table 3). Similar results were also reported by Gaur *et al.* (1979). Results presented in Table 1 to 3 indicates that there is no specific period during the year, when the infection rate of a particular species of wild animal becomes abnormally high. This may be due to the fact that most of the herbivorous and carnivorous wild animals maintained under captivity are stall fed and once they acquire infection through food and water they remain infected for most part of the year irrespective of seasonal variation. This factor might have been different in the same speceis of wild animals present in free forest and such comparative study could be carried out to establish the role of sesonal factors on the influence of parasitic worm load in wild animal. Srivastava *et al.* (1990) also found a lower incidence of parasitic infection during the winter season as compared to monsoon in a number of wild species. Similar observation has also been made by Horak (1979) and Schellner (1979). Srivastava *et al.* (1990) opined that the effect of seasonal incidence on parasitic infection may be dependent on the source of food and water supply throughout the year. This might be nearer the truth but can not be said definitely in absence of critical experimental study.

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Table 2. Seasons influence on the prevalence of parasitic infection among herbivorous zoo animals of Bihar.

Animal	Seasons	Number of animals examined	Number of animal found positive	% of infection	Value of X^2_3 d.f.
Elephant	Monsoon	3	3	100.00	
(Elephas maximus)	Winter	3	3	100.00	
	Spring	3	3	100.00	
	Summer	3	3	100.00	
		12	12	100.00	0.000
Genda	Monsoon	4	3	75.00	
(Rhinoceros unicornis)	Winter	5	3	60.00	
	Spring	4	2	50.00	
	Summer	5	2	40.00	
		18	10	55.56	1.192
Mithun	Monsoon	1	1	100.00	
(Bos gaurus frontalis)	Winter	2	1	50.00	
	Spring	2	1	50.00	
	Summer	2	1	50.00	
		7	4	57.14	0.877
Nilgai	Monsoon	13	3	23.08	
(Boselaphus	Winter	13	3	23.08	
tragocamelus)	Spring	15	4	26.67	
	Summer	15	4	26.67	
		56	14	25.00	0.094
Black buck	Monsoon	9	3	33.33	
(Antilope cervicapra)	Winter	11	3	27.27	
	Spring	8	2	25.00	
	Summer	10	2	20.00	
		38	10	26.31	0.445
Sambar	Monsoon	16	5	31.25	
(Cervus unicolor)	Winter	18	6	33.33	
	Spring	16	4	25.00	
	Summer	17	4	23.53	
		67	19	28.36	0.568
Spotted deer	Monsoon	18	10	55.55	
(Asix axis)	Winter	18	8	44.44	
	Spring	16	6	37.50	
	Summer	17	6	33.29	
		69	30	43.48	1.770
Capped langoor	Monsoon	4	4	100.00	
(Presbytis pileatus)	Winter	5	5	100.00	
	Spring	4	4	100.00	
	Summer	5	5	100.00	
		18	18	100.00	0.000
Golder langoor	Monsoon	4	2	50.00	
(Presbytis geei)	Winter	3	3	100.00	
	Spring	4	3	75.00	
	Summer	4	3	75.00	
		15	11	73.33	2.214
Common langur	Monsoon	13	7	53.85	
(Presbytis entellus)	Winter	14	6	42.85	
	Spring	15	9	60.00	
	Summer	12	9	75.00	
		54	31	57.41	2.840

Table 3. Seasonal influence on the prevalence of parasitic infection among carnivorous zoo animals of Bihar.

Animal	Seasons	Number of animals examined	Number of animal found positive	% of infection	Value of X^2_3 d.f.
Lion (*Panthera leo*)	Monsoon	8	2	25.00	
	Winter	8	3	37.50	
	Spring	9	3	33.33	
	Summer	8	2	25.00	
		33	10	30.30	0.447
Tiger (*Panthera tigris*)	Monsoon	14	9	64.29	
	Winter	14	8	57.14	
	Spring	16	8	50.00	
	Summer	13	5	38.46	
		57	30	52.41	1.967
Leopard (*Panthera pardus*)	Monsoon	1	5	45.45	
	Winter	12	7	58.33	
	Spring	13	7	53.84	
	Summer	12	5	41.67	
		48	24	50.00	0.834
Clouded leopard (*Neofelis nebulosa*)	Monsoon	3	2	66.67	
	Winter	4	3	75.00	
	Spring	3	2	66.67	
	Summer	3	1	33.33	
		13	8	61.53	0.783
Golden cat (*Felis temmincki*)	Monsoon	1	1	100.00	
	Winter	1	1	100.00	
	Spring	1	1	100.00	
	Summer	1	1	100.00	
		4	4	100.00	0.000
Fishing cat (*Felis viverrina*)	Monsoon	2	1	50.00	
	Winter	2	1	50.00	
	Spring	2	1	50.00	
	Summer	2	1	50.00	
		8	4	50.00	0.000
Leopard cat (*Felis bengalensis*)	Monsoon	7	4	57.14	
	Winter	6	3	50.00	
	Spring	7	2	29.57	
	Summer	7	2	28.57	
		27	11	40.74	1.851
Indian fox (*Vulpes bengalensis*)	Monsoon	3	1	33.33	
	Winter	3	1	33.33	
	Spring	2	1	50.00	
	Summer	3	1	33.33	
		11	4	36.36	0.198
Wolf (*Canis lupus*)	Monsoon	1	1	100.00	
	Winter	1	1	100.00	
	Spring	1	1	100.00	
	Summer	1	1	100.00	
		4	4	100.00	0.000
Hyaena (*Hyaena striata*)	Monsoon	8	2	25.00	
	Winter	7	2	28.57	
	Spring	8	1	12.50	
	Summer	7	1	14.29	
		30	6	20.00	0.766
Bear (*Selenarctos* sp.)	Monsoon	10	7	70.00	
	Winter	9	5	55.56	
	Spring	10	5	50.00	
	Summer	9	3	37.50	
		37	20	54.05	1.980