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Short Contribution

Activity Pattern of Chital *(Axis axis)* in Mukandra Hills Tiger Reserve, India

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ABSTRACT

Chital *(Axis axis)* is most abundant wild ungulate in most of the wildlife reserves of India and main prey species for top carnivores. Diurnal activity pattern of Chital was studied during Oct. 2017 to Sept. 2018 in Mukandra Hills Tiger Reserve, which provides adequate water and food for wildlife throughout the year. Activity Pattern was studied using scan animal sampling technique and concluded that Chital spend maximum time in feeding, which is followed by resting, movement, social activity, anti predatory activity and other activities. Chital were most active at dawn and dusk.

Key Words: Anti-predatory; Feeding; Movement; Resting; Social.

INTRODUCTION

Ungulate plays an important role in food chain of forest ecosystem and Chital (*Axis axis*) is most abundant ungulate in Indian forests (Krishnan 1972, Sharatchandra and Gadgil 1975, Dinerstein 1980). A bulk of ungulate biomass is formed by Chital in wild (Karanth and Sunquist 1992, Khan et al. 1996, Dave 2008). Chital being a medium sized deer is a preferred prey species for tiger (Biswas and Sankar 2002, Bagchi et al. 2003, Andheria et al. 2007). It belongs to family 'cervidae' and is native to Indian subcontinent (Prater 1971, Sankar 1994). Chital is a social animal and prefer grassland adjacent to dense forest required for escape from any danger (Raman 1997, Ramesh et al. 2012). Its daily requirement restricted its distribution mainly to area with availability of water (Moe and Wegge 1994).

STUDY AREA

This study has been conducted to evaluate the activity pattern of Chital in Mukandra Hills Tiger Reserve (MHTR), which is notified as third tiger reserve of Rajasthan (India) in 2013 (Khan 2015). It is situated at 24°38′ to 25°7′ N Latitude and 75°26′ to 76°12′ E Longitude in South-Eastern Rajasthan. It has fairly good potential for Chital population. It stretches over 80 km long valley between parallel hills with a width of 2-5 km in its major part. Chambal, Kalisindh and Ahu Rivers are lifeline of this Tiger Reserve (Nama et al. 2013).

MATERIAL AND METHODS

During this study direct observation was done using scan animal sampling technique (Altman 1974). Chital were approached and followed without disturbing the herd for data collection (Mathur 2002). The activities of were observed from dawn to dusk. The daily schedule of observation was divided in to three sessions i,e, morning, noon and evening. Six behavioural categories were recorded: feeding, resting, movement, social activity, anti predatory and other activities (drinking, urination, defecation, milk suckling and salt licking). The percent of time spent on various activities were calculated and analyzed statistically using SPSS.

RESULTS

During this study data were recorded for one year from October 2017 to September 2018. In study area group size of Chital ranged 1-65 individuals with a mean group size of 9.44 ± 0.36. Various activities were performed in following decreasing order of frequency: feeding (40.85%), followed by resting (23.95%), movement (16.09%), social activity (7.85%), anti predatory activity (5.96%) and other activity (5.18%).

Activity Pattern of different activities was analyzed to observe the influence of different seasonal variations throughout the year. One Way ANOVA revealed that seasonal variation in activity pattern of different activities was significantly different for feeding, movement, resting, anti predatory and other activities but was not significantly different for social activity (Table 1; Figure 1). There was significant difference for temporal change in activity pattern for feeding, resting and social activities but there was no significant difference for movement, anti predatory activity and other activities (Table 2; Figure 2).

Table 1. One Way Anova for seasonal variation in activity pattern in MHTR

Activity	MHTR	Sum of Squares	df	Mean Square	F	Sig.
Types of Fedding	Between Groups	544.0	2	272.0	452.5	**0.000**
	Within Groups	2120.2	3527	.601		
	Total	2664.3	3529			
Types of Movement	Between Groups	3.37	2	1.68	15.05	**0.000**
	Within Groups	155.5	1388	.11		
	Total	158.9	1390			
Position of Resting	Between Groups	2.55	2	1.27	5.15	**0.006**
	Within Groups	511.6	2067	.24		
	Total	514.1	2069			
Types of Social Activity	Between Groups	197.2	2	98.61	2.73	**0.066**
	Within Groups	24375.4	676	36.05		
	Total	24572.7	678			
Anti Predatory Activity	Between Groups	1.875	2	.93	4.15	**0.016**
	Within Groups	115.4	512	.22		
	Total	117.3	514			
Types of Other Activity	Between Groups	128.9	2	64.4	65.16	**0.000**
	Within Groups	440.2	445	.989		
	Total	569.1	447			

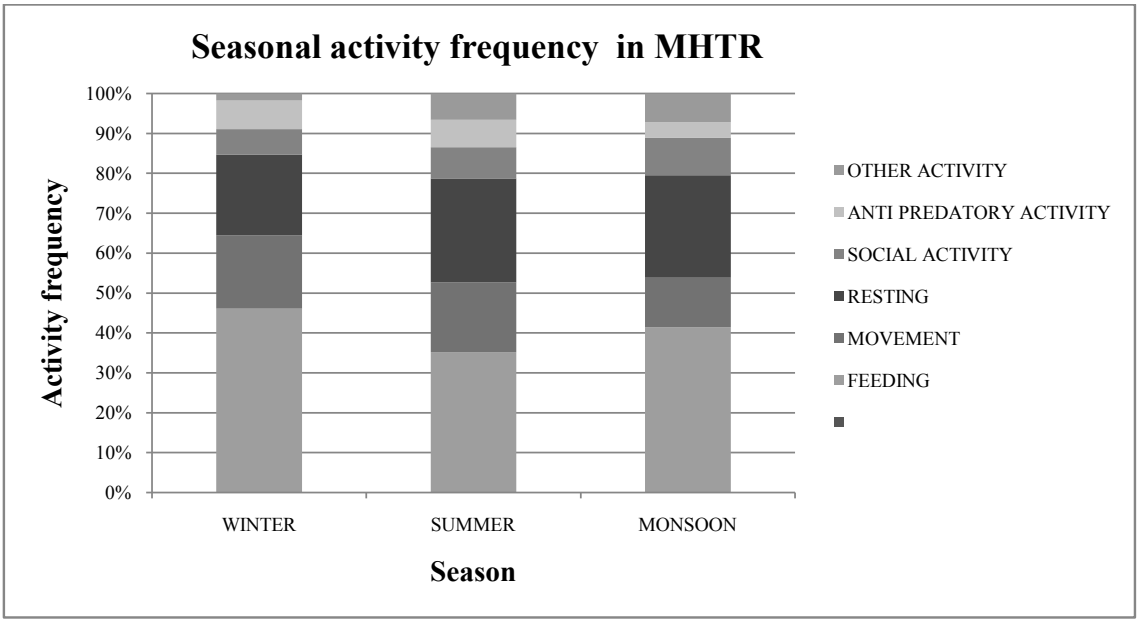

Figure 1. Activity pattern % comparison during different season in MHTR

Table 2. One-way Anova for temporal change in activity pattern in MHTR

Activity		Sum of Squares	Df	Mean Square	F	Sig.
	Between Groups	13.50	2	6.751	8.982	**0.000**
Types of Feeding	Within Groups	2650.8	3527	0.752		
	Total	2664.3	3529			
	Between Groups	.502	2	0.251	2.198	**0.111**
Types of Movement	Within Groups	158.4	1388	0.114		
	Total	158.9	1390			
	Between Groups	9.21	2	4.607	18.86	**0.000**
Position of Resting	Within Groups	504.9	2067	0.244		
	Total	514.1	2069			
	Between Groups	650.5	2	325.2	9.192	**0.000**
Types of Social Activity	Within Groups	23922.1	676	35.38		
	Total	24572.7	678			
	Between Groups	.148	2	0.074	.323	**0.724**
Antipredatory Activity	Within Groups	117.219	512	0.229		
	Total	117.367	514			
	Between Groups	4.152	2	2.076	1.635	**0.196**
Types of Other Activity	Within Groups	565.042	445	1.270		
	Total	569.194	447			

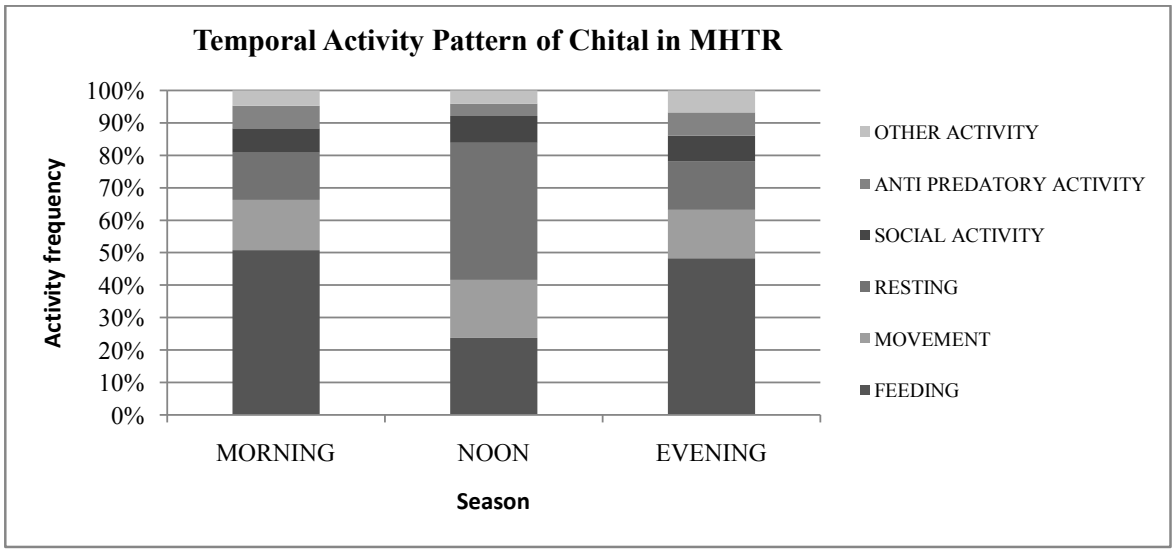

Figure 2. Temporal activity pattern percentage of Chital in MHTR

Seasonal changes influenced the feeding pattern effectively. During monsoon Chital preferred to graze variety of available grasses. Feeding on fallen leaves was the main mode of feeding during winter and summer but browsing percentage increased from winter to summer season hence grazing percentage decreased from winter to summer season.

Chital were seen in a mutual relationship with Langurs as were observed together in many observations. Langurs were used to drop fruits and leaves to the ground. Chital were seen to feed on fallen leaves and fruits when green grass was usually not available during winter and summer in different ratio. Thus there were two foraging peaks, one in the morning and other in the evening and animals were used to rest after feeding in noon.

Animals were more social from spring to early monsoon indicated summer as peak breeding season though some breeding occurs throughout the year. Standing alert with raised ear and tail in response to any danger sign was common anti-predatory behaviour. Alarm calls were heard mainly during morning and evening time when animals were most active. Thumping forefeet was observed near water holes. Drinking was mainly observed during morning and evening session probably due to animal prefers to drink water after morning feed and noon rest respectively.

DISCUSSION AND CONCLUSION

Chital and Langur were observed to respond to each other's alarm calls for early detection of predators thus probably benefited both (Newton et al. 1989). Chital exhibited matriarchal leadership system and fawns were seen associated with mother for protection (De and Spillet 1966, Eisenberg and Lockhart 1972). Feeding was the most dominant activity similar as were observed in most of the tiger reserves (Chandra 2013). It was observed that Chital preferred to rest in the noon time while feed during morning and evening (Graf and Nicholas 1966, Tak and Lamba 1984, De Silva and De Silva 1992). During rainy season Chital tends to remain more active in open area (Schaller 1967).

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