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Food habits of dhole *Cuon alpinus* in Kalakad-Mundanthurai Tiger Reserve in Tamil Nadu, India

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ABSTRACT

Food habits of dhole *Cuon alpinus* studied in Kalakad-Mundanthurai Tiger Reserve from January 2010 to July 2010 by analyzing 78 scats. Ten prey species were consumed by dholes in which Sambar was consumed highest percentage (30.77%) followed by wild pig (23.08%) and lowest was Jungle fowl (0.063%). In terms of biomass contribution sambar was highest (78.70%) while jungle fowl was lowest contribution (3.85%). The total prey biomass consumed by dhole was 191.72 kg during our study period. This study will give basic information on food habits of dhole and also gives basic idea for better management strategies to protect this elegant carnivore.

Key words: KMTR, Food habits, Dhole, Western Ghats, Scat analysis

INTRODUCTION

Food habits are basic importance to understand the ecology and natural history of the carnivores (Miquelle *et al*., 1996). Asiatic wild dog is least studied pack hunting social carnivore in the wild and it is red listed as endangered species by International Union for Conservation Nature (IUCN, 2010). Although some of the studies (Johnsingh, 1983; Karanth & Sunsquit, 1995; Venkatraman *et al*., 1995) have been done in Western Ghats on dhole's diet, there is no information exist in southern most places of Western Ghats. Based on earlier scat analysis, (Johnsingh, 1983; Karanth & Sunsquit, 1995; Venkatraman *et al*., 1995; Acharya, 2007; Borah *et al*., 2009) chital and sambar were the high percentage in dhole diet. Though dhole has wide prey species, it mainly focused on medium sized prey such as adult male chital (*Axis axis*) from 30 to175 kg (Johnsingh, 1983; Karanth & Sunsquit, 1995; Venkatraman *et al*., 1995). Scat analysis widely used techniques in carnivore studies an inherent problem with this is prey are lost during mastication and digestion (Acharya, 2007). Increased human disturbance pushed dhole to high degree of isolation and even local extinction (Johnsingh, 1983). In this contest the present study will provide the basic idea about dhole diet for park managers to conserve the prey and protect its habitat.

Study area

The study was conducted from February 2010 to July 2010 in Kalakad Mundurai Tiger Reserve (77°30 E and 8°40 N**),** Tamil Nadu. Sengaltheri, Kakachi, Oothu and Kannikatti and Mundanthurai plateau within the reserve were chosen for collecting the scat in contiguous forest. KMTR lies in southern end of Western Ghats which covers an area of 900 km^2 with an elevational range of 100 m to 1800 m. The vegetation types such as dry thorn forests, deciduous forests, grasslands and wet evergreen rain forests. KMTR has several endangered fauna and flora such as tiger *Panthera tigris,* leopard *Panthera pardus*, lion tailed macaque *Macaca silenus* and nilgiri tahr *Hemitragus hylocrius* (Johnsingh, 2001).

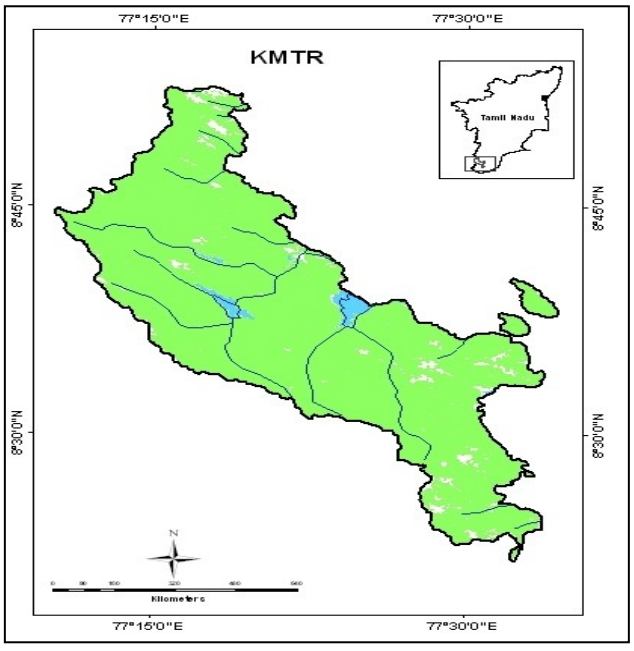

Figure 1. Kalakad Mundanthurai Tiger Reserve, Tamil Nadu.

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Annual temperature fluctuates from 17 to 32C and annual rainfall is 3500mm (Devy & Davidar, 2001). Around 145 villages found fringes of forest (Arjunan *et al*. 2006) and 10000 thousand cattles often grazing and causing degradation of foot hill forest (Dutt, 2001).

METHODS

Determining the food habits scat analysis (Putman, 1984) was used earlier studies (Emmons, 1987; Rabinowitz, 1989). Scats were collected from road, trails and streams or water holes from January 2010 to July 2010. Dhole scats differ from collective defecation "dung pile" (Cohen *et al*., 1978) this is not reported in domestic dog and jackal and could be distinguished readily from the scats of the two felids, which were larger, stickier and deposited on grass (Johnsingh, 1983). Tiger and leopard scats were distinguished using the size and shape of the scats, or secondary evidences such as pugmarks and scrapes. Only one scat was collected from a latrine site per pack per day in order to ensure that were collected from single kill. The collected scats were washed in order to remove the prey remains (Claws, tooth's, quills and bones) and dried in sunlight for two to three days before microscopic examinations. Hairs were identified by cuticles hair impression and medullary methods in laboratory. To calculate the scat adequacy for each predator scat samples, we used Brillouin diversity index (Brillouin, 1956) which account for non random scat collection (Cupples *et al*. 2011) than other common diversity indices (Pielou, 1975).

$$H = \frac{\ln N! - \sum \ln n_i!}{N}$$

Where, H is diversity is total number of prey and n_i is the number of individual in the i^{th} prey items frequency of prey occurrence and biomass consumptions by dholes calculated by Floyd *et al*. (1976) correction factor $Y(i) = 0.035 + 0.020) X(i)$, where: $Y(i)$ = weight of prey species i consumed per field collectible scat $X(i)$ = average weight of an individual of species i**.** Average weight of the each prey species were taken from the available literatures.

RESULTS

We have analysed 78 scats in which 10 prey species were consumed by dhole. Brillouin diversity index shows that analysed scat was adequate in our study area and it was stabilized at 55 th scat (Fig 2). Sambar was representing 25 times followed by wild pig was 18 times and the lowest contribution was gaur (n=2) and chital (n=2).

In terms of biomass contribution sambar (*Rusa unicolor*) was high, followed by cattle 30.77%, wild pig (*Sus scrofa*) 23.08%, gaur (*Bos garus*) 10.24%, langur (*Semnopitheus entellus*) 1.70%, chital (*Axis axis*) 1.40%, mouse deer (*Tragulus memima)* 1.11%, hare (*Lepus nigricollis*) 1.10% and grey jungle fowl (*Gallus sonneratii*) 0.63%. Maximum prey species were obtained in our study was at 55th scats. The Total prey biomass consumed by dhole was 191.72 kg from January to July 2010.

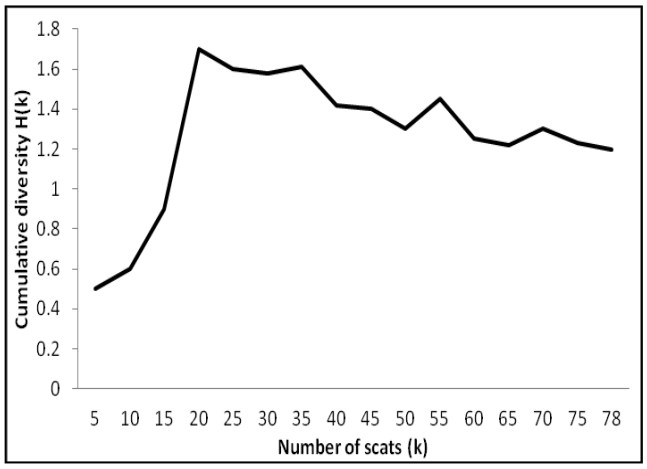

Figure 2. Brillonin diversity index for scat adequacy.

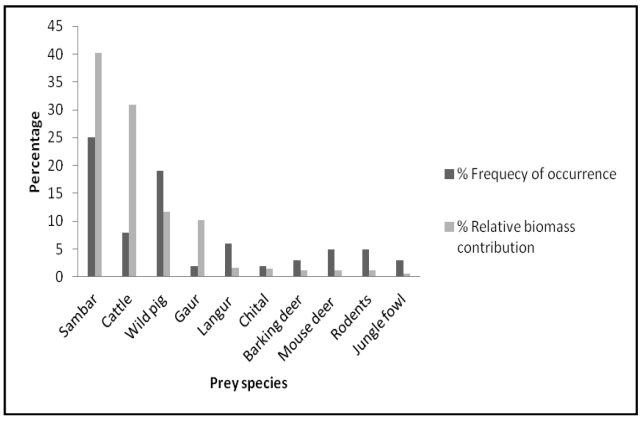

Figure 3. Comparison of frequency occurrence and prey biomass contribution.

DISCUSSIONS

In terms of prey biomass contribution sambar was contributing and lowest was jungle fowl. Cattle was contributing considerable amount this mainly because of cattle grazing inside the park. Since we had not surveyed in the villages, did not now the actual livestock depredation in the villages. Sambar was taken considerable amount where as chital was low it could be the reason of restricted distribution of chital in Mundanthurai plateau. Similar studies (Johnsingh, 1983; Venkatataman *et al*., 1995; Karanth & Sunquist, 1995) in south India shows (Table 2) that adult male chital was preferable prey for dhole whereas in central India (Acharya, 2007), sambar was taken more than its availability. In Pakke Tiger Reserve (Northeastern India,)dhole had eaten largely medium sized prey such as wild pig (Gopi *et al*., 2012). Large prey size preference by dhole might be the large pack size of the dhole, we have seen 28 dholes in a pack during our study period. Common hare was taken significant amount in Mudumalai Tiger Reserve (Cohen *et al*., 1978) and Sathpura Tiger Reserve (Borah *et al*., 2009) where as in our study it was present in lower amount which may be due to the diversity of prey available and low occurrence of other carnivores in our study area. Mouse deer was consumed higher amount in Mudumalai Tiger Reserve (Ramesh *et al*., 2012) where as in our study shows it was consumed negligible amount.

Table 1. Prey species composition in dholes scats (n=78), their relative biomass contribution in dhole diet and production of scats for each prey species in Kalakad-Mundanthurai Tiger Reserve, Tamil Nadu.

Species	Avg body weight (X)	Frequency of occurrence (F)	Frequency %	Weight of prey eaten per scat (Y)	Prey biomass consumed(B)	% Relative biomass contribution
Sambar	135	24	30.77	3.08	73.92	38.7
Cattle	350	8	10.26	7.38	59.04	30.91
Wild pig	40	18	23.08	1.18	21.24	11.12
Gaur	470	2	2.56	9.78	19.56	10.24
Nilgiri Tahr	70	2	2.56	1.78	3.56	1.85
Langur	8	6	7.69	0.54	3.24	1.7
Chital	48	2	2.56	1.34	2.68	1.4
Barking deer	20	3	3.85	0.78	2.34	1.23
Mouse deer	2.2	5	6.41	0.424	2.12	1.11
Rodents (Hare)	2.1	5	6.41	0.422	2.11	1.1
Jungle fowl	1.1	3	3.85	0.402	1.206	0.63
					191.016	

Y=0.38+0.02X ; X =Average weight of each prey species ; B=Foxy ; Total Prey weight consumed 191.72 Kg

Table 2. Frequency (%) of prey species in dhole scat in Indian subcontinent.

Prey species	Present study	Pakke TR	MTR	BTR	NGRTR	Pench	STR	SW
Sambar	30.77	17.79	16.85	8.8	11.1	40.6	46.97	60.9
Cattle	10.26	3.06	0.34	-	-	1.7	-	9.4
Wild pig	23.08	52.14	0.42	6.6	8.6	0.1	0.06	0.7
Gaur	2.56	4.2	1.01	0.5	2.2	0.1	-	
Nilgiri Tahr	2.56	-	-	-	-	-	-	-
Langur	7.69	-	1.6	0.45	0.4	2.6	4.55	0.7
Chital	2.56	-	70.85	66.8	54.1	50.5	30.3	
Barking deer	3.85	17.79	0	2.2	24	-	1.52	22.5
Mouse deer	6.41	NP	3.2	0.5	4.7	-	-	-
Rodents (Hare)	6.41	1.22	2.95	-	-	1.9	40.97	-
Jungle fowl	3.85	2.1	0.42	-		-	1.52	-

Pakke – Selvan *et al*., 2013; MTR (Mudumalai TR)-Ramesh *et al*., 2012; BTR (Bandipur TR)-Antheria *et al*., 2007; NCRTR (Nagerhole TR)- Karanth and Sunquist, 1995; Pench TR-Acharya, 2007; Satpura TR –Borah *et al*.,2009; SW(Singye Wangchuck) - Wang, 2008..

Endangered Nilgiri Tahr was also recorded in the scat that was colleced in higher elevational range. Since small number of scats in higher elevational range, further long term study has to carry out to see preference towards the Nilgiri Tahr. This study mainly was to give baseline information on food habits of dhole in southern most Western Ghats. This information will help managements to give the better protection for wild prey as well as predators. We need more studies to understand the foraging ecology of dhole in this southern most range of Western Ghats.

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