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Group size, age - sex composition of Chital (*Axis axis*) in Mukandra Hills Tiger Reserve

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Abstract

To plan and achieve the management needs for wild life conservation, monitoring of any concerned are is necessary. Rajasthan has a forest cover of approximately 6% 0f the geographical area of the state. Study of Group size, age and sex composition of Chital (*Axis axis*) in Mukandra Hills Tiger Reserve (Wild), India was conducted during October 2017 and June 2018. Group Composition represents social organization of the Chital herd. Road transects were monitored monthly to gather information on group size, age and sex composition of Chital in Mukandra Hills Tiger Reserve (MHTR). Mean group size for Chital was 7.34 ±0.49 (N=581) in MHTR. Male, female and fawn ratio in MHTR was 42.61: 100: 41.66 (N=4264). Higher female sex ratio was probably due to selective male predation by predators in MHTR. Group's age sex composition influenced group formation in the study area. Male and fawn influenced group size. Mean group size for Chital was 7.34 ±0.49 (N=581) in Mukandra Hills Tiger Reserve (Wild). Peak fawning was observed from October to April. Although breeding and fawning occurs throughout the year, Chital showed seasonality in breeding and fawning.

Key words: Ungulate, Cervid, Anthropogenic activities, Antler

Introduction-

The Chital is a medium sized deer included under Schedule III of Wildlife (Protection) Act 1972.Chital is listed as Least Concern because they inhabit a very wide range within which there are many large populations. Although it is still declining in some sites (particularly outside protected areas), at the species level any such declines are at nowhere near the rate required to qualify for listing even as Near Threatened (IUCN). Chital is on of the most common and widely distributed cervids in the Indian subcontinent. The Chital population is under stress due to anthropogenic activities in their habitats both in captivity and in wild, resulting in many changes in their grouping behavior (Davey, 2005). One such change is in the group size and age-sex composition. Many studies (De and Spillet, 1966; Pratter, 1934,1971; Barrette,1991; Johnsingh, 1983; Krishnan,1972; Mishra,1982; Miura,1981; Mitra,1986; Raman,1997; Schaller,1967; Sharatchandra and Gadgil,1975; Tak and Lamba,1984; Chappel,1989) have indicated that Chital is sensitive to environmental changes. Among several wild ungulates of the Indian subcontinent Chital is one of the

species whose grouping behavior has been studied in some detail. Till now no study has been conducted on widely dispersed and low density Chital population on the Mukandra Hills Tiger Reserve. Present study aims at filling this gap.

Study area-

Study area for research work includes Mukandra Hills Tiger Reserve (MHTR) which is notified third Tiger Reserve of Rajasthan vide S. No: F3 (8) FOREST 2012 dated 09/04/2013 under WPA 1972. MHTR includes core area (417.17 square km) and buffer area (342.82 square km) with a total 759.99 square km area. There are 16 villages inside core area and 14 villages in buffer area of MHTR. It is located in the south east part of Rajasthan of India. As for boundary information Chambal, Ahu and Kalisindh River situated at west, south and east boundary of MHTR. Delhi-Mumbai Railway Track and Jaipur -Jabalpur National Highway divides MHTR in two parts. MHTR comprise of fairly dense Forest. MHTR is densely wooded and is spread over a hilly terrain. MHTR is lush green with Foliage many rare medicinal herbs and trees (Nama et al., 2013). Mukandra Hills Tiger Reserve is named after the two parallel hills with a central narrow ridge, a part of Vindhyachal Range system and are approximately 80 Km in length and 2-5 km in width. It is situated at Kota, Rajasthan mainly but spread in Bundi, Chittorgarh and Jhalawar District also. It includes Mukandra National Park, Dara Sanctuary, Jawahar Sagar Sanctuary and Chambal Sanctuary. It lies between 24°38´ to 25°7´ N Latitude and 75°26´ to 76°12´ E Longitude.

Materials and Methods-

Comparative study of Group size, age and sex composition of Chital (*Axis axis*) in MHTR was conducted in the year 2017-2018 in different time intervals. Road transects were monitored monthly to gather information on group size, age and sex composition of Chital in MHTR. When Chital herd were sighted, observations were made to determine their numbers in the group and age-sex of each individual animal. The observations were ocular aided with 10-22 x 50 binoculars. Group size, age and sex composition were recorded while moving along road transects and sitting by waterholes at MHTR with the help of a well designed elaborate check sheet. All study animals were divided in six categories of age and sex (adapted from Schaller, 1967, and, Mishra, 1982) based on their height, coat colour and presence/condition or absence of antlers i.e.

i. Adult male: Colour - Darker; Height at shoulder - around 3ft for Chital; antler length - above 1ft when full grown.

ii. Sub adult male: Colour - lighter; Height at shoulder - around 2½ ft for Chital; antler length - arond 1 ft. when fully grown.

iii. Yearling male: Colour - lighter; Height at shoulder - 2ft for Chital; antler length - around 5 to 6 inches long spike antler for Chital when fully grown.

iv. Adult female: Colour - lighter; Height at shoulder - 2 ¾ft for Chital; antler absent.

v. Yearling female: Colour - lighter; Height at shoulder - 2ft for Chital; antler absent.

vi. Fawn: Colour - lighter; Height at shoulder - around or below mother's chest height for Chital; antler absent.

Results and discussion-

A total of 581 Chital groups were observed comprising 4264 individuals with a maximum group size of 48 were sighted in the MHTR. Chital in MHTR tends to be in smaller groups of 2 to 5 individuals (39.01% of the total groups sighted).The group size averaged 7.34± 0.49 individuals per group. In MHTR of the total individuals observed, 964 were fawns i.e. 22.61%. Male, female and fawn ratio in MHTR was 42.61: 100: 41.66 (N=4264). Higher female sex ratio was probably due to selective male predation by predators in MHTR. Group's age sex composition influenced group formation in both study area. Male and fawn influenced change in group size. Group size changes due to increased anthropogenic activities observed by Karanth and Sunquist, (1992), and, Srinivasulu, (2001). Chital group size change temporally and in relation to habitat was observed by Bagchi et al. (2008), and, Ramesh et al. (2012). Increase in group size in relation to availability of food has been studied by Khan and Vohra, (1992), and, Khan et al. (1995). Group size in relation to social behavior was observed by Graf and Nicholas (1966), and, Fuchs (1977).

Seasonal grouping pattern of Chital in MHTR-

Season	Number of groups observed	Number of animals observed	Group size in percentage					Largest group observed	Mean group size	Stan-dard error of mean
			1	2-5	6-10	11-30	>30			
Winter	277	1554	19.86	44.40	22.74	12.27	0.72	39	5.61	0.25
Summer	304	2710	10.26	34.86	25.98	24.34	4.27	48	8.91	0.47
combined data	581	4264	14.97	39.01	24.19	18.39	2.55	48	7.34	0.49

Sex Ratio of Chital in MHTR-

Season	Male	Female	Fawn	Number of animal observed
Winter	35.05	100	21.92	1554
Summer	48.26	100	56.42	2710
CD	42.61	100	41.66	4264

Age structure of Chital in MHTR-

Season	Adult Male		Sub Adult Male		Yearling Male		Adult Female		Yearling Female		Fawn		Number of Animal observed
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Winter	148	9.52	104	6.69	95	6.11	765	49.23	225	14.48	217	13.96	1554
Summer	359	13.25	105	38.75	175	6.46	1024	37.79	300	11.07	747	27.57	2710
CD	507	11.89	209	4.90	270	6.33	1789	41.96	525	12.31	964	22.61	4264

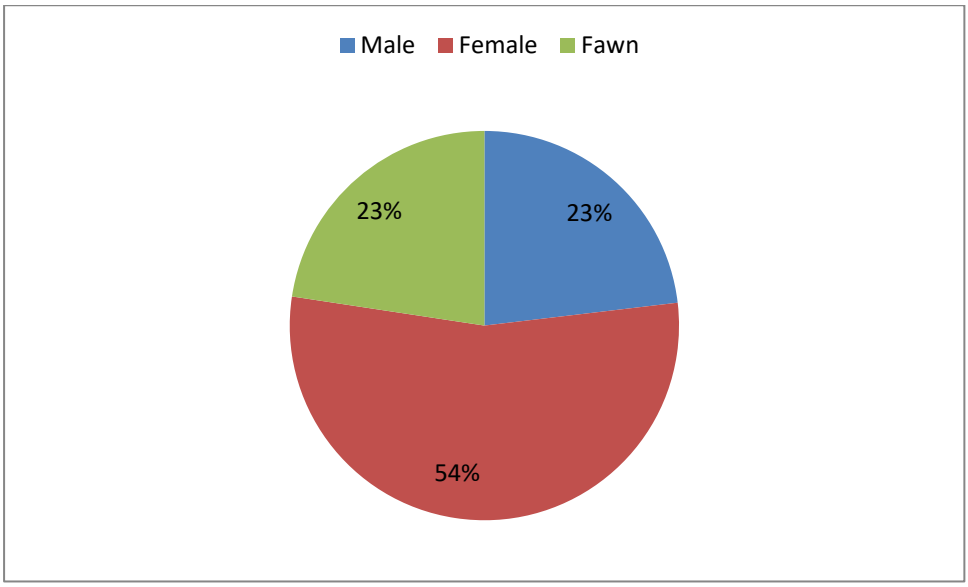

Fig-1.Group Composition (% of Chital male, female and fawn) in MHTR 2017-18

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