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## Seasonal Variation in Population of Cheetal Deer (*Axis axis* Erxleben 1777) in Bijrani Zone of Corbett National Park Uttarakhand, India

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### ABSTRACT:

Cheetal, Sambar and Barking species are chief food for Tiger in Corbett. The abundance of Tiger is depending on the population of Cheetal, Sambar and Barking deer. The Bijrani zone is most preferred zone in Corbett Park among tourist (Indian and Foreign). This study is conducted from November 2017 to June 2019. The study is done for population structure of Cheetal deer in Bijrani zone of Corbett Park. The Cheetal deer (*Axis axis*) is very common and abundant species found in grasslands of Corbett National Park. There is a seasonal variation found in monthly population of Cheetal deer. The highest population density of Cheetal deer is 56.4 per sq. km. There is a maximum visibility in Park area in March. The population is depends on food availability in particular area. There is availability of sprouting grasses after control burning, green leaves in trees with inflorescence, and some edible fruits and flower like Semal in spring season. So the population of Cheetal is found highest in spring season in Bijrani zone of Corbett National Park. While in pre-winter and winter season the animal is seen only in Sun to avoid cold. In summer season the herds break and animal moves to core area for shady places and near water stream area for green vegetation and to avoid extreme temperature from grassland. So the population of Cheetal species is found lowest in December and June month of study period.

**Keywords:** Grassland, Bijrani Rest House, Primary Data Collection, Yearling.

### Introduction

Jim Corbett National Park (1936) covers an area of about 520.82 sq. km, and is spread across the districts of Nainital, Almora, and Pauri Garhwal of Uttarakhand state of India [6]. Its topography is as the latitude 29°13'-29°35'N, longitude 78°33'-79°46'E, and altitude varying from 380-1040m above sea level [3]. This National Park is located in the foothills of the Himalayan geographical area of India [1]. The Himalayan and peninsular flora and fauna both are found in the Reserve on account of their location in the foothills [4].

Corbett National Park is famous for presence of rich number of Tigers in current time. According to official figures of Corbett, the number of tigers in Corbett was 215 in 2014; it has increased to about 250 in 2020. There are about 20 per 100 sq. km tigers in the Corbett Tiger Reserve [2]. The Cheetal deer form a major portion of the diet of Tiger in Corbett Park.

### Materials and Methodology

**Study area:** The Bijrani zone is selected for the population structure of Cheetal deer out of five tourism zone of Corbett Park. The total area of Bijrani zone is 117.77 sq. km. The latitude and longitude of the Bijrani zone are 29.4613° N and 79.1478° E respectively and its entry gate is Aamdanda gate Ramnagar. In the Bijrani zone, there are different vegetative sites: Sal-forest, grassland with mixed tree species, dense shrub area with Lantana bushes, large grassland area (Chaur), seasonal water streams, and hilly terrains. The study points in Bijrani zone are Semalchaur-chowki, Bijrani-rest house, Machan-chaur, Ringoda-chaur and Malani-rest house. The different roads in Bijrani zone are Ring-road, Jad-Pahad road, Cheetal-road, Ringoda-road and Nakatal-road. The natural water sources in Bijrani zone are Garjia-sot, Kichar-sot, Reethapani-sot, Nakatal, Khina-sot and Malani-sot.

The dominant species is Sal with some other species like Jamun, Rohini, Semal, Haldu, Bael, Amla, Shisham, Kanju, Serus, Pipal, Badh and Khair. The dominant shrub species are Lantana, Peelu and Kari plant. The dominant grasses are Sabai grass (baib), Kush grass, Elephant grass, Tiger grass and Munj grass found in grasslands of Bijrani zone.

### Methods used in study:

This study is conducted from November 2017 to June 2019 by direct observation. For primary data collection the field visits were conducted in Bijrani zone of Corbett National Park [7]. For population density the transect method is used during field visit. In this method five random transects of 1.0 sq. km area were run by the gypsy and in buffer area by foot walk with rural people. The different transects were selected from grassland with mixed-tree

species, Chaur-area, Sal-mixed forest, shrub-area and near water-stream area [5]. The animal herds were counted with the help of binocular (Pantax s10×50 S-series) and photos were clicked by camera (24.2MP). The Cheetal deer is counted in five categories i.e., adult male, adult female, yearling male, yearling female and fawn.

## Results and Discussion

**Table 1: Population density of different category of Cheetal in Bijrani zone (from November 2017 to June 2018)**

Population density (per sq. km)						
Month	Mean population	Male	Female	Fawn	Yearling male	Yearling female
November 2017	23.00	3.8±0.86 <sup>c</sup>	10.6±1.28 <sup>c</sup>	1.8±0.37 <sup>ab</sup>	2.2±0.66 <sup>b</sup>	4.6±0.51 <sup>cd</sup>
December 2017	12.80	1.0±0.44 <sup>a</sup>	5.40±0.97 <sup>b</sup>	2.6±0.67 <sup>ab</sup>	1.6±0.4 <sup>ab</sup>	2.2±0.37 <sup>ab</sup>
January 2018	20.80	1.8±0.37 <sup>a</sup>	10.0±1.41 <sup>c</sup>	3.6±0.24 <sup>b</sup>	2.0±0.71 <sup>b</sup>	3.4±0.51 <sup>bc</sup>
February 2018	30.80	4.2±0.58 <sup>c</sup>	12.80±1.93 <sup>c</sup>	6.6±0.92 <sup>c</sup>	2.4±0.24 <sup>b</sup>	4.8±0.49 <sup>cd</sup>
March 2018	51.60	6.6±0.92 <sup>d</sup>	22.4±1.50 <sup>d</sup>	9.4±1.50 <sup>d</sup>	5.4±0.75 <sup>c</sup>	7.8±1.06 <sup>c</sup>
April 2018	34.80	2.8±0.58 <sup>b</sup>	12.8±1.56 <sup>c</sup>	7.6±0.92 <sup>cd</sup>	5.2±1.16 <sup>c</sup>	6.4±1.07 <sup>de</sup>
May 2018	8.80	1.8±.37 <sup>a</sup>	2.2±0.66 <sup>a</sup>	1.4±0.24 <sup>ab</sup>	1.0±0 <sup>ab</sup>	2.4±0.51 <sup>e</sup>
June 2018	3.20	0.6±.24 <sup>a</sup>	1.4±0.50 <sup>a</sup>	0.8±0.20 <sup>a</sup>	0±0 <sup>a</sup>	0.4±0.24 <sup>a</sup>

**Table 2: Population density of different category of Cheetal in Bijrani zone (from November 2018 to June 2019)**

Population density (per sq. km)						
Month	Mean population	Male	Female	Fawn	Yearling male	Yearling female
November 2018	23.6	2.8±0.37 <sup>bc</sup>	12.20±1.80 <sup>c</sup>	2.2±0.66 <sup>a</sup>	1.4±0.24 <sup>ab</sup>	5.0±0.70 <sup>b</sup>
December 2018	19.0	2.2±0.66 <sup>abc</sup>	7.40±1.77 <sup>bc</sup>	2.2±0.58 <sup>a</sup>	3.0±0.70 <sup>bc</sup>	4.2±0.66 <sup>b</sup>
January 2019	25.2	2.8±0.37 <sup>bc</sup>	9.60±2.01 <sup>c</sup>	4.2±0.73 <sup>abc</sup>	3.4±0.4 <sup>c</sup>	5.2±1.01 <sup>b</sup>
February 2019	31.6	4.2±1.06 <sup>c</sup>	13.20±1.82 <sup>c</sup>	7.2±1.31 <sup>bc</sup>	3.0±0.70 <sup>bc</sup>	4.0±0.70 <sup>b</sup>
March 2019	56.4	7.0±1.04 <sup>d</sup>	26.60±3.31 <sup>d</sup>	9.0±3.56 <sup>c</sup>	4.2±0.66 <sup>c</sup>	9.6±1.36 <sup>c</sup>
April 2019	39.0	3.2±0.96 <sup>bc</sup>	12.80±1.82 <sup>c</sup>	6.4±0.92 <sup>abc</sup>	4.2±0.86 <sup>c</sup>	11.6±1.46 <sup>c</sup>
May 2019	13.0	1.0±0.31 <sup>ab</sup>	3.60±0.60 <sup>ab</sup>	4.2±1.15 <sup>abc</sup>	1.6±0.40 <sup>ab</sup>	2.6±0.67 <sup>ab</sup>
June 2019	5.8	0.4±0.40 <sup>a</sup>	1.60±0.50 <sup>a</sup>	2.4±0.50 <sup>ab</sup>	0.4±0.24 <sup>a</sup>	1.0±0.31 <sup>a</sup>

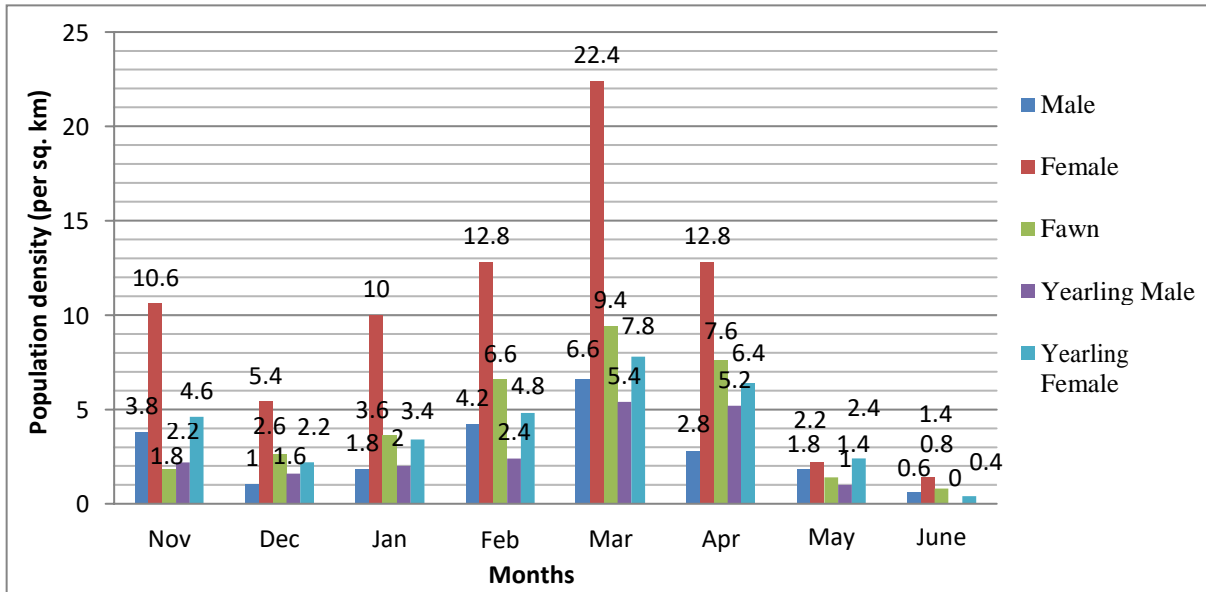


Figure 1: Monthly variation in population density of different category of Cheetal deer in Bijrani zone (from November 2017 to June 2018)

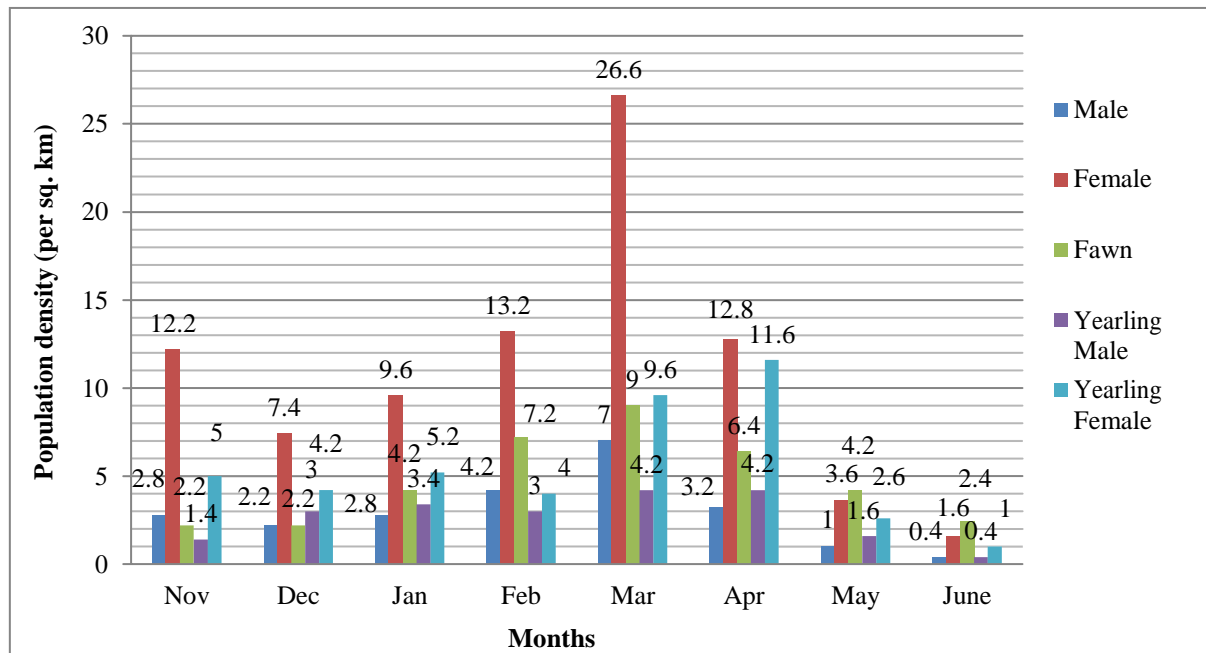


Figure 2: Monthly variation in population density of different category of Cheetal deer in Bijrani zone (from November 2018 to June 2019)

There is a variation in monthly population density of Cheetal deer. In the first-year of study, the highest population of Cheetal found was 51.6 per sq. km in March. In this month, the population of adult male was 6.6 per sq. km, the adult female was 22.4 per sq. km, the yearling male was 5.4 per sq. km, the yearling female was 7.8 per sq. km and the fawn density was 9.4 per sq. km, which is more than the population density in other months. The lowest population mean of Cheetal deer was obtained at 3.2 per sq. km in June 2018. According to the age composition of Cheetal, the lowest mean population of adult males and yearling males are 0.6 per sq. km, and 0.0 per sq. km respectively (Table 1).

In the second year also, the highest mean population was 56.4 per sq. km obtained in March. The male population was 7.0 per sq. km, the adult female was 26.6 per sq. km, the yearling male was 4.2 per sq. km, the yearling female was 9.6 per sq. km and the fawn was 9.0 per sq. km (Table 2). The monthly population of Cheetal is depending on seasonal food present in Bijrani zone. The large herds are found in grassland where grasses available for Cheetal. Also large herds are found near the Peelu shrub and Kari plant, and under the trees for fruits like Bael, Jamun, Gular, Amla, and for Semal flower etc. The lowest mean population of adult males and yearling males are 0.4 and 0.4 per sq. km respectively in second year study (Table 2). In summer, the group breaks and animals move to moist, shady places of core area and near water sots.

According to the above data, the population density of Cheetal deer is found higher in the second year of study in Bijrani zone. The reason for the increasing population of Cheetal deer is the availability of green grasses and the abundance of favourite food and there is no need to move to the buffer area. Also, the maximum breeding with fawning is found in the second year [5].

From the above study, it is also clear that the adult males migrate first from the group. After this the yearling males move, then the adult females move. While the adult females and lactating females stay with the fawn and feed inside the dry grassland, searching for green grass and leaves.

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### Conclusion:

The highest mean population of Cheetal deer was 56.4 per sq. km obtained in March 2019, in which the abundance of females is found with their fawns. This population structure is depends on availability of favourite food. As the large herds are found in grassland area (grassland contains Sabai, Kush, Elephant grass and Tiger grass etc.), under the tress (with edible fruits) and road side near the Peelu and Kari plants. The Cheetal groups are breaks in summer, when the animals move in search of green food and water and to avoid extreme temperature in grassland.

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