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A preliminary survey of mammalian fauna in Pench Tiger Reserve, Madhya Pradesh India

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Abstract

In the present study Karmajhiri range of Pench Tiger Reserve (here after PTR) were surveyed and data on 320 circular sampling plots of 10m radius were collected for investigating status, and distribution of different mammalian species of PTR. All the pellets/dung/faecal matter were collected from the 16 transects of 2 km each, covering all 16 administrative beat as well as 4 circles of Karmajhiri range of PTR were collected and stored. Through indirect evidences we have reported nine species of mammals, six species of ungulates (Cheetal, Sambar, Nilgai, Barking deer, Wild boar and Gaur), one species of rodents (Porcupine) one species of Lagomorphs (Black naped hare) and one species of primate (Common Langur). Mean pellet group density of chital and sambar were found maximum (923.17±96.71, 228.1±15.3) in Alikatta, and Turia Circle and minimum (154.86±22.01, 146.07±17.72) in Turia and Baghdev circle respectively. Similarly mean pellet group density of nilgai was maximum (48.17±6.84) in Alikatta and minimum (18.31±5.27) in Baghdev. Mean dung pile density of gaur was found maximum (5.17±1.54) in Karmajhiri and minimum (0.39±0.39) in Alikatta. Mean faecal matter density of wild boar and porcupine were maximum (11.54±3.41, 4.37±3.99) in Karmajhiri and minimum (2.38±1.23, 1.99±1.03) in Turia and Baghdev respectively. Similarly mean faecal matter density of langur and black naped hare were recorded maximum (29.06±16.44, 9.55±4.71) from Baghdev and Karmajhiri and minimum (9.55±3.12, 3.18±1.45) from Turia and Alikatta respectively. Barking deer was only reported from Baghdev and the mean pellet group density was (0.08±0.08).

Keywords: Density, Indirect evidences and Pench Tiger Reserve

1. Introduction

For conducting any study in any area, the 1st essential thing which a researcher or investigator is to do a reconnaissance or extensive survey of the area. While surveying the area one can familiarize with that area which helps in while gathering various valuable informations. To achieve above said goal we surveyed the core area of PTR which comes under Karmajhiri range as well as Indira Priyadarshani National Park. PTR is India's 19th tiger reserve and there are many justifications for its status. The entire Pench region has long been known for its floral and faunal richness. The area is a part of significant bio-geographic region represented by tropical dry deciduous and slightly moist teak and mixed forest. Encompassed by a contiguous and extensive forest belt, and thus creating compact biomass with relatively low biotic pressure, it promises to be another potential habitat of different species of mammals.

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The core zone of PTR is divided into 4 circles, each having 4 beats. While surveying the core area we try to find out the density and diversity of different mammalian fauna on the basis of different administrative units. PTR is an area which offers opportunity for research on large mammal's population and their habitats. Large mammals by virtue of their bigger size and home range are relatively more prone to extinction as a consequence of fragmentation and degradation of habitat. This leads to increase concern among scientist and researchers. Studies of mammals always fascinate scientist, researchers as well as common people because man himself belongs to this class. The present study deals with the density and diversity of different administrative circles' as well as different administrative beats of Karmajhiri range as far as mammals are concern.

2. Study Area:

The study was conducted in Karmajhiri range of PTR or Indira Priyadarshini National Park, Madhya Pradesh

(Fig.1). The Reserve is located in the Satpura Maikal Landscape in the Seoni and Chhindwara districts (78° 55'E – 79° 35'E and 21° 35'N -22° N). It was the 19th Tiger Reserve declared, in the year 1992. It has a total area of 757.85 sq. km, which includes the Sanctuary (183 sq. km), the National Park (245.85 sq. km) and Reserved Forest (229 sq. km). Pench Tiger Reserve belongs to the Indo-Malayan phyto-geographical region. Ecologically, Pench is categorized as a tropical moist deciduous (TMD) tiger habitat. Floristically, the Tiger Reserve can be classified, according to Champion and Seth (1968) [2], as, Tropical moist deciduous forests and Tropical dry deciduous forests. The area has 4 seasons: Summer (March-June), Monsoon (July-August), Post-monsoon (September-October) and winter (November-February), with temperature ranging from 0⁰ C in peak winter to 45⁰ C in the peak summer; it receives an average annual rainfall of 1400 mm (Sankar *et al.* 2000) [14].

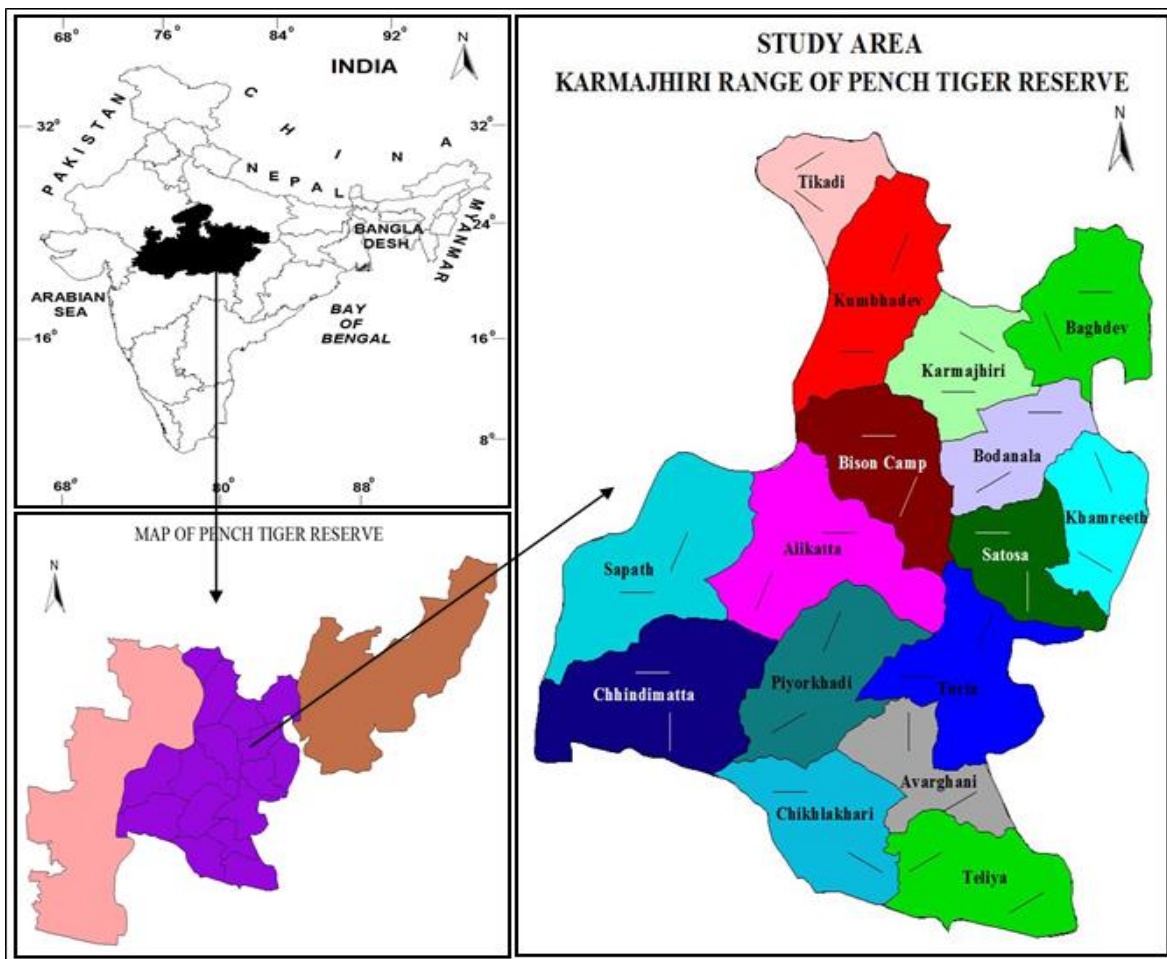


Fig 1: Map of Study Area showing location of transects in different administrative beats of Pench Tiger Reserve (Not to scale)

3. Methodology:

3.1 Data collection:

While surveying the area we try to assess abundance and distribution of mammalian species in different administrative beats of the Karmajhiri range of PTR. Two line transects of two km each were indentified and marked in each beat. For abundance of mammals in different beats we use indirect method. At every transect different sampling plots were marked at 200 meter interval and searched for faecal matter/droppings of different mammalian species, as a sign of species presence. Faecal matter/droppings are the best indicator for the presence of species in a particular habitat. (Ilyas and Khan, 1998^[5], 2005^[6], Ilyas, 2001^[7], 2006^[8], 2007^[9], Khan, 1993^[10], Haleem *et al.* 2014a^[3] & 2014b^[4]). A total of 320 sampling plots were established in the intensive study area and on each sampling plot faecal matter of different mammals were counted in 10 m radius circular plots. The faecal

matters of different mammalian species were differentiated on the basis of shape, size and colour.

3.2 Data analysis:

Pellet groups/ faecal matter of different mammal's species were counted at each sampling plot to assess the mammal's density. Pellet groups/ faecal matter densities were calculated for each and every plot and on the basis of that the mean pellet group densities were calculated for different beats, circles and habitats of Karmajhiri range of PTR. Kruskal Wallis One way analysis of variance and multiple comparisons (Scheffe's) were used to test for significant differences in mean density of mammal's vis-à-vis administrative beats and circles. All statistical tests were performed, using computer programme SPSS 6.1 (Norusis, 1994)^[13].

Table 1: Mean density ± SE of different mammalian species in different administrative beats of PTR

S.No	Beat	Mean Density ± SE								
		Barking deer	Black naped hare	Chital	Bison	Langur	Nilgai	Porcupine	Sambar	Wildboar
1	Tikadi	0.00	0.00	651.27±81.44	12.74±4.85	7.96±3.16	36.62±9.03	15.92±15.92	230.89±36.08	23.89±10.56
2	Kumbhadev	0.00	35.03±17.73	135.35±33.07	3.18±2.19	23.89±15.48	4.78±3.48	0.00	181.53±31.94	6.37±4.96
3	Karmajhiri	0.00	3.18±3.18	219.74±64.19	4.78±2.61	7.96±5.60	31.85±14.43	0.00	184.71±37.65	4.78±3.48
4	Bison camp	0.00	0.00	657.64±151.55	0.00	71.66±42.97	9.55±4.68	1.59±1.59	253.18±95.92	11.15±5.79
5	Baghdev	0.32±0.32	0.00	121.02±36.50	1.59±1.59	92.36±64.36	17.52±7.11	0.00	210.19±54.30	9.55±5.22
6	Khamreeth	0.00	7.96±6.48	318.47±46.55	1.59±1.59	4.78±4.78	4.78±2.61	0.00	84.39±20.05	1.59±1.59
7	Bodanala	0.00	14.33±8.48	272.29±45.60	0.00	9.55±5.22	44.59±18.40	3.18±2.19	202.23±31.62	0.00
8	Satosha	0.00	4.78±2.61	334.39±55.81	0.00	9.55±4.68	6.37±3.73	4.78±3.48	87.58±10.56	22.29±22.29
9	Sapath	0.00	0.00	2003.18±159	0.00	36.62±20.96	47.77±10.71	4.78±2.61	132.17±24.26	25.48±9.41
10	Chindimatta	0.00	0.00	437.89±62.29	0.00	7.96±5.60	65.29±15.57	0.00	253.18±32.22	9.55±4.07
11	Piyorthadi	0.00	6.37±4.38	254.78±30.30	1.59±1.59	1.59±1.59	20.70±9.03	4.78±3.48	245.22±52.54	3.18±2.19
12	Alikatta	0.00	6.37±3.73	996.81±167.03	0.00	23.89±8.61	58.92±16.54	1.59±1.59	203.82±29.62	4.78±4.78
13	Chikhlakhari	0.00	0.00	105.09±34.51	3.18±2.19	11.15±6.23	1.59±1.59	0.00	253.18±38.42	1.59±1.59
14	Avarghani	0.00	3.18±3.18	176.75±63	3.18±2.19	0.00	20.70±7.41	0.00	232.48±30.4	0.00
15	Turia	0.00	0.00	242.03±23.94	1.59±1.59	17.52±8.16	76.43±20.19	0.00	210.19±26.38	6.37±4.38
16	Teliya	0.00	11.15±4.78	95.54±39.82	0.00	9.55±6.97	55.73±16.96	0.00	216.56±27.20	1.59±1.59

4. Results:

4.1 Mammals density in different administrative beats of PTR

Mean pellet group density of chital was found significantly maximum (2003.18±159) in Sapat and minimum (95.54±39.82) in Teliya ($F_{15\ 304} = 34.977$, $P < 0.05$). Mean pellet group density of sambar was recorded maximum (253.18±95.92) from Biosn camp, Chindimatta, and chikhlakhari and minimum (84.39±20.05) in Khamreeth with a significant result ($F_{15\ 304} = 1.790$, $P < 0.05$). In the same way dung pile density of gaur was recorded maximum (12.74±4.85) from Tikadi and minimum (1.59±1.59) from Baghdev, Khamreeth, Piyorthadi and Turia and the results were significant ($F_{15\ 304} = 3.25$, $P < 0.05$). Similarly mean pellet group density of nilgai was found maximum (76.43±20.19) in Turia and minimum (1.59±1.59) in Chikhlakhari showing a significant result ($F_{15\ 304} = 4.076$, $P < 0.05$). For Wild boar mean faecal matter density was found maximum (25.48±9.41) in Sapat and minimum (1.59±1.59) in Khamreeth, Chikhlakhari and Teliya, however results were found to be insignificant ($F_{15\ 304} = 1.326$, $P > 0.05$). Mean droppings density of langur was found maximum (92.36±64.36) in Baghdev and minimum (1.59±1.59) in Piyorthadi with an insignificant result ($F_{15\ 304} = 1.503$, $P > 0.05$). Likewise mean faecal matter density of porcupine was recorded maximum (15.92±15.92) in Tikadi and minimum (1.59±1.59) in Bison camp and Alikatta and the results were found to be insignificant ($F_{15\ 304} = 0.918$, $P > 0.05$). Mean faecal matter density of black naped hare was found significantly maximum (35.03±17.73) in Kumbhadev and minimum (3.18±3.18) in Karmajhiri and Awarghani ($F_{15\ 304} = 1.668$, $P < 0.05$). In the same pellet group of barking

deer was only recorded from Baghdev and the mean pellet group density was (0.32±0.32) showing an insignificant result ($F_{15\ 304} = 1.0$, $P > 0.05$) (Table 1).

4.2 Mammals density in different administrative circles of PTR

Mean pellet group density of chital and sambar were found maximum (923.17±96.71, 228.1±15.3) in Alikatta, Turia and minimum (154.86±22.01, 146.07±17.72) in Turia and Baghdev respectively and the results were found to be significant ($F_{3\ 316} = 34.881$, $P < 0.05$, ($F_{3\ 316} = 3.106$, $P < 0.05$)). Similarly mean pellet group density of nilgai was significantly maximum (48.17±6.84) in Alikatta and minimum (18.31±5.27) in Baghdev ($F_{3\ 316} = 5.407$, $P < 0.05$). Mean dung pile density of gaur was found maximum (5.17±1.54) in Karmajhiri and minimum (0.39±0.39) in Alikatta with a significant result ($F_{3\ 316} = 5.191$, $P < 0.05$). Mean faecal matter density of wild boar and porcupine were maximum (11.54±3.41, 4.37±3.99) in Karmajhiri and minimum (2.38±1.23, 1.99±1.03) in Turia and Baghdev respectively, however results were found to be insignificant ($F_{3\ 316} = 1.252$, $P > 0.05$, $F_{3\ 316} = 0.721$, $P > 0.05$). Similarly mean faecal matter density of langur and black naped hare were recorded maximum (29.06±16.44, 9.55±4.71) from Baghdev and Karmajhiri and minimum (9.55±3.12, 3.18±1.45) from Turia and Alikatta respectively with an insignificant results ($F_{3\ 316} = 0.753$, $P > 0.05$, $F_{3\ 316} = 1.043$, $P > 0.05$). Barking deer was only reported from Baghdev and the mean pellet group density was (0.08±0.08) and the result was found to be insignificant ($F_{3\ 316} = 1.0$, $P > 0.05$) (Table 2).

Table 2: Mean density ± SE of different mammalian species in different administrative circles of PTR

S.No	Species	Mean Density± SE			
		Karmajhiri	Baghdev	Alikatta	Turia
1	Barking deer	0	0.08±0.08	0	0
2	Gaur	5.17±1.54	0.79±0.55	0.39±0.39	1.99±0.86
3	B.N. Hare	9.55±4.71	6.77±2.75	3.18±1.45	3.58±1.49
4	Chital	416.0±53.14	261.54±24.75	923.17±96.71	154.86±22.01
5	Langur	27.86±11.68	29.06±16.44	17.51±5.93	9.55±3.12
6	Nilgai	20.70±4.67	18.31±5.27	48.17±6.84	38.61±7.48
7	Porcupine	4.37±3.99	1.99±1.03	2.78±1.16	0
8	Sambar	212.57±28.10	146.07±17.72	208.59±18.59	228.1±15.3
9	Wild boar	11.54±3.41	8.36±5.71	10.75±2.99	2.38±1.23

5. Discussion

To investigate the all mammalian species present in PTR, survey of entire area of PTR was done using indirect evidences at administrative beat level and the data were further pooled up at different administrative circles level for some useful meanings. During survey it was found that cheetal were most abundant mammal species of the park and their abundance was maximum in Alikatta circle. This may be due to presence of extensive open grassy area in Alikatta. Sambar was more abundant in Turia circle followed by Karmajhiri, because of presence of more hilly terrain in both these circles as sambar was reported to prefer hilly terrains (Ilyas, 2001)^[7]. Nilgai was found maximum in open area of Alikatta due to presence of their feeding habit. In case of gaur it was observed that they were more abundant in Karmajhiri circle and within that they were sighted frequently in Tikadi beat, because of flow of Pench River through this circle (Majumder, 2011)^[12]. Wild bores were found maximum in Karmajhiri and within that they were more frequent in Tikadi beat, as they are reported to found near human habitation (Khan, 2015)^[11]. Porcupines were reported maximum again from Karmajhiri due to presence of teak dominating forest as well as hilly terrain which the porcupine prefers (Akram, 2015)^[1]. Abundance of Langur was more or less same in all circles except Turia and this may be due to hilly terrains. Black napped hare were reported maximum in Kumbhadev beat of Karmajhiri circles. The reason for this could be due to presence of favoured micro habitat features in teak dominating forest of the area. Barking deer was only reported from Baghdev and probably this may be due to hilly dense terrain with water. The overall results show that among all the four circle of Pench National Park, Karmajhiri was having maximum density and diversity of mammals.

6. Conclusion:

Management and long term research in a protected area needs base line data. Estimation of mammalian population in PTR is a small step towards this and it can be used in developing of management plan as well as long term survival of the species. The findings of present study suggest that the estimated population of herbivores is quite adequate and in a position to support carnivores population. Probably due to this, fairly good number of tigers has been reported from PTR.

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