

# Encounter rate of large mammals in Thanigebyle range of Bhadra wildlife sanctuary, Karnataka

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## Abstract

Estimation of large mammals by using line transect method in the Thanigebyle range of Bhadra Wildlife Sanctuary during May 2009 to April 2010 in Thanigebyle range for four species of large herbivorous mammals viz., Chital (*Axis axis*), Sambar (*Cervus unicolor*), Barking deer (*Muntiacus muntjak*) and Gaur (*Bosgaurus*). The sanctuary was divided into several zones based on location and habitat types. Four permanent walking transect of 1 km were cut in different habitats of water holes for direct count and walk once in each month and four permanent vehicle transects of 18 kms were made. A total of 22 kms per month transect was evaluated including both walking transect and permanent vehicle transect of 4 kms and 18 kms respectively. This evaluation indicates that maximum number of individuals was observed in the walking transect when compared to vehicle transect for all the four species. During our study 21 Sambar, 161 Chital, 8 Barking deer and 21 Gaur was encountered. Chital was observed more in the study area. It also reveals that during pre monsoon and post monsoon seasons the number of individuals was observed to be higher.

**Keywords:** Encounter rate, Line transect method, Large mammals, Wildlife census.

## INTRODUCTION

A major management challenge in conserving large herbivores is monitoring their populations, which is crucial both to assess the success of management and to formulate future management strategies. Monitoring herbivore population dynamics also helps us better understand various ecological processes at landscape and ecosystem levels. However, reliable estimates of herbivore densities in the forests of tropical Asia are rare. Though several investigators have conducted surveys to estimate ungulate densities in India (Schaller, 1967; Berwick, 1974; Sankar, 1994). Non-protected lands are of prime importance for wildlife conservation activities, since they have a crucial place within the ecological network by the significance of the area they cover and their role in the connectivity between protected areas (Bennett 1998). The sustainable management of these areas is therefore considered as a central aspect for wildlife conservation policies (Western 1989; Child and Child, 1991; Halladay and Gilmour, 1995). Estimating the population size, encounter rate of an animal species in an area is fundamental to understanding its status, demography and to plan for its management and conservation. In spite of the development of sophisticated statistical methods of sampling animal populations, their application to estimating densities in tropical forests is difficult mainly because of poor visibility and relatively low density of these populations resulting in inadequate sample size for statistically

precise results. Estimates based on indirect methods usually involve counting animal droppings, while direct methods use visual sightings of animals. Line transect sampling is practical, efficient and relatively inexpensive for many biological populations (Anderson *et al.*, 1979; Burnham *et al.*, 1980; Buckland *et al.*, 1993).

## STUDY AREA

The Bhadra wildlife sanctuary of Karnataka lies in the tropical forest of the Western Ghats in Chikmangalore district of Karnataka covering an area of 492.46 sq.km. Temperature varies from 10°C in winter maximum of 32°C in summer. Here we made an effort cover one range of Bhadra wildlife sanctuary that is Thanigebyle range lies from 13° 22' to 13° 47' N latitude, 75° 29' to 75° 45' E longitude and covers an area of 82.49 sq.km.

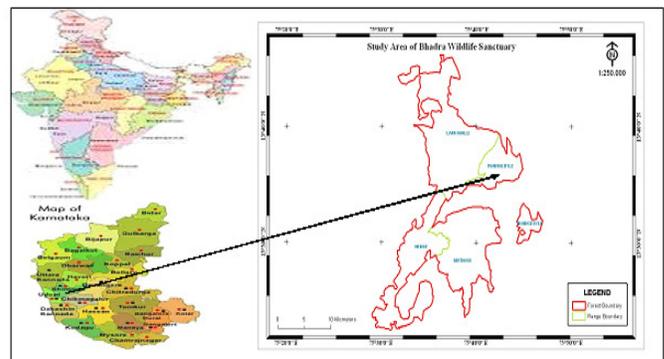


Fig 1. Map Showing the Thanigebyle Range of Bhadra Wildlife Sanctuary

## MATERIAL AND METHOD

### Encounter Rate Estimation Method

Based on vegetation types, the area was stratified into different

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habitat zones such as dry deciduous forests, moist deciduous forests, semi evergreen forests, and grassland type forests (Champion and Seith, 1968). Transect lines were placed in these zones in a fashion that they sampled each zone in rough proportion to their areas.

**Vehicles based counts**

During our census several game roads were traversed using a vehicle at a near constant speed of 20 km per hour. Four routes were identified so has to cover all the habitat types in rough proportion to their areas. Total distance covered by vehicle transect was 264 kms during the study period. The good network of roads inside the sanctuary made it possible to cover these regularly by vehicle.

The analyses were carried out separately for each species in monthly wise by walking and vehicle transect. A general form of encounter rate is given by.

$$\text{Encounter rate} = \frac{\text{Number of sightings}}{\text{Total kms of distance traveled}}$$

Variance of the mean encounter rate was estimated as a

composite of the variances of sample size, mean, standard deviation per km.

**RESULT AND DISCUSSION**

During our study from May 2009 to April 2010 we have recorded the monthly data of animal census using transect method. The total distance covered by vehicle and by walking transect is 264 km and monthly distance covered is 22kms. The study area consists of mainly 4 zones of habitat strata to be utilized by the wild animals. They are natural forest, teak plantations, grasslands and water holes. During the current census the proportion of the area representing the forest type, forest range, total distance, weather condition, starting and ending time, GPS data of latitude and longitude at the beginning and ending and the number of sightings were tabulated in a prescribed encounter rate data sheet (Nayak, 2004). During our study a total of 21 Sambar, 161 Chital, 8 Barking deer and 21 Gaur was encountered (Table 2). Chital was observed more in the study area. Month wise encounter rate of all species were observed encounter rate per kilometer was observed more during the July, September, January respectively that is 1.14, 1.95 and 1.68 (Table 1). Sambar prefers dry and moist deciduous forest and semi evergreen forest and high tree density (Johnsingh, 1983).

Table1. Month-Wise Encounter Rate of All Species

Months	Encounter rate (per km)
May-09	0.73
Jun-09	0.14
Jul-09	1.14
Aug-09	0.50
Sep-09	1.95
Oct-09	0.59
Nov-09	0.73
Dec-09	0.36
Jan-10	1.68
Feb-10	0.73
Mar-10	0.45
Apr-10	0.77

Table2. Encounter Estimation of Four Species.

Species	Distance covered (km)	Sample Size	Mean group size ± SD	Encounter rate (per km) ± SD
Sambar	264	21	1.75±1.55	0.08±0.07
Chital	264	165	13.75±11.49	0.63±0.52
Barking Deer	264	8	0.67±0.78	0.03±0.04
Gaur	264	21	1.75±2.26	0.08±0.1

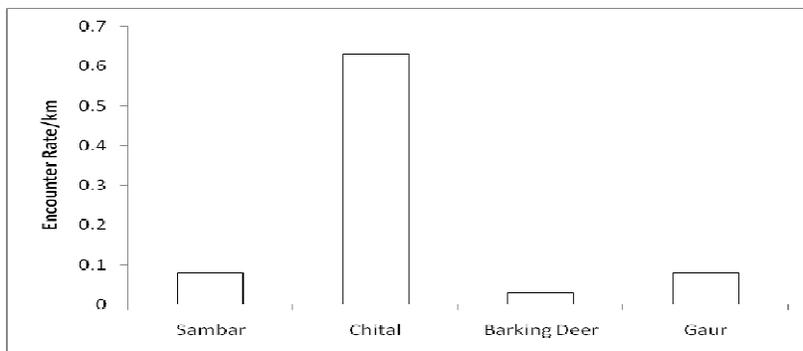


Fig 2. Variation of Encounter Rate of Different Species

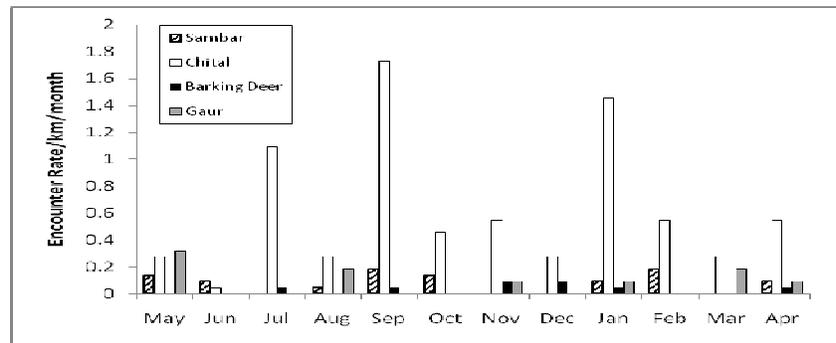


Fig 3. Variation of encounter rate of each species in different months

Sambar prefers sites that score low in terms of direct human disturbance and similar conclusions can be drawn for barking deer and same thing we have observed in our study. While barking deer prefers plain areas, moist deciduous habitats in a decreasing order dry deciduous and teak plantation. Whereas, Barking deer was found rich where the availability of tender shoots, bamboo leaves and fruits are present they are often found grazing during early morning and late evening they usually take rest under cool shades of dense under growth and regular visitors of salt licks. A very high encounter rate of Chital may be responsible for their similar abundances along road sides and the interior of the forest. This observation supports that the high encounter rate was found in open ground areas from the forest edge, probably due to animals feeding on open ground (Varman and Sukumar, 1995). In habitats where the undergrowth is more open and has shorter grasses, a very high encounter rate of chital may be responsible for their similar abundances along road sides and the interior of the forest. This observation supports the findings of Silanjan *et al.*, (1997). The Gaur was observed where the grasses and other diverse herbs, shrubs and leaves of young or small trees are present. Gaur clearly avoid roadside probably because of disturbances from vehicular traffic in the sanctuary (Raghavendra and Vijaya Kumara, 2009).

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