

THE FIRST POPULATION ESTIMATE OF SOME HERBIVORES IN GARUMARA NATIONAL PARK, WEST BENGAL

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Introduction

Garumara National Park is located in Jalpaiguri District of West Bengal. The Park is known for the Great Indian One-horned Rhinoceros (*Rhinoceros unicornis* L.), along with other major herbivores like Elephant (*Elephas maximus* L.), Gaur, Wild Boar and four species of Deer viz, Barking Deer, Spotted Deer, Hog Deer and Sambar. The census operation for Rhinoceros and Elephant have been carried out regularly all over West Bengal. However, no population data is available for the remaining herbivores. Therefore, a census operation was carried out in the P.A. in April, 1998 for the purpose of obtaining an estimate of population density of the six main herbivorous species viz. Gaur (*Bos gaurus*), Barking Deer (*Muntiacus muntijak*), Spotted Deer (*Axis axis*), Hog Deer (*Axis porcinus*), Sambar (*Cervus unicolor*) and Indian Wild Boar (*Sus scrofa*).

Study Area

Garumara National Park having an area of 79.44 km² covering the following forest types, according to Champion and Seth's classification (1968), was the main study area.

Riverine forest - (5B/1S2)
Sal forest - (3C/C1b,3C/C1c)

Wet Mixed forest - (2B/2S)
Savannah forest - (3C/DS)

Three types of ecological areas have been found to be utilised by the wild animals, viz., natural forest (woodland), Plantation and grassland. Area statement of Garumara National Park is given in Table 1.

Table 1
*Area Statement of Garumara
National Park (km²)*

Natural Forest (Woodland)	49.96
Plantation	18.02
Grassland (including blank area)	4.60
Non-cultivable area	6.86
Total area	79.44

Materials and Methods

The whole study area was broadly stratified horizontally into three zones : Natural forest, Plantation and Grassland. The stratification is based on the difference in patterns of requirements, use and adaptation of the three main habitats by various species of herbivores, with the purpose to reduce variability in the data set and hence to increase precision by lowering standard error around the estimated mean number.

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Within each stratum, different enumeration blocks were defined to traverse the area systematically. There were total 21 enumeration blocks - 11 in the woodland, 6 in plantation and 4 in grassland. Each block was assigned to a census team.

The census was carried out either on foot (11 blocks) or on Elephant back (10 blocks). The census teams on foot consisted of 6 to 7 members and traversed a scheduled track of 8-10 km, while the census teams on Elephant back comprised of 3 to 4 members and covered a lateral distance of about 10-12 km.

Census was started at 5.30 in morning and completed by 11 a.m. Direct sighting of animals, on either side of the transect was noted. Time and direction of movement was also noted to avoid double counting. The process was repeated on the second day.

Determination of Transect Width : Lateral

visibility changes with the following factors, which, in turn, determine the transect width :

- (a) Type of vegetation (Natural forest/Plantation/Grassland).
- (b) Means of survey (on foot/on Elephant).
- (c) Relative size of animal (Wild boar/Sambar/Gaur).

Based on the above factors and a few sample surveys, the width of transect (i.e. 2 x lateral visibility on one side of transect) for the six target species in three types of habitat was followed as given in Table 2.

Total 21 numbers of transects, covering 27.7 km² were surveyed thoroughly. Area traversed was calculated on the basis of King Census formula :

Area = Transect Length x 2 x Mean perpendicular distance x Coefficient.

Table 2
Width of transect (m)

Type of vegetation	Natural forest		Plantation		Grassland	
	On Foot	On Elephant	On Foot	On Elephant	On Foot	On Elephant
Species						
Wild Boar, Barking Deer	10	30	15	45	20	60
Sambar Hog Deer, Spotted Deer	20	60	30	90	40	120
Gaur	30	90	45	130	60	150

Table 3
Area Surveyed (km²) and Sampling intensity (%)

Target Species		Wild Boar, Barking deer		Hog deer, Spotted deer, Sambar		Gaur
		1st day	2nd day	1st day	2nd day	1st day
Nat. Forest	Area Surveyed	5.35	4.55	10.70	9.10	16.74
	Sampling intensity	10.70	9.10	21.41	18.21	33.50
Plantation	Area Surveyed	2.83	2.78	5.65	5.57	8.40
	Sampling intensity	15.70	15.42	31.35	30.91	46.61
Grassland	Area Surveyed	1.02	1.02	2.04	2.04	2.56
	Sampling intensity	22.17	22.17	44.34	44.34	55.65

Table 4
Population Estimation in Garumara National Park

Species	Habitat	Density (No. of animals/km ²)	Standard Error (±)	Estimated population with S.E.	Estimated mean population
Wild Boar	Natural forest	4.39	0.77	219±38	259
	Plantation	0.71	0.33	13±6	
	Grassland	5.88	0.50	27±2	
Barking Deer	Natural forest	0.18	0.09	9±4	36
	Plantation	0.70	0.33	13±6	
	Grassland	2.94	0.25	14±1	
Hog Deer	Natural forest	0.18	0.12	9±6	21
	Plantation	0.53	0.34	10±6	
	Grassland	0.49	0.28	2±1	
Sambar	Natural forest	0.093	0.08	5±4	11
	Plantation	0.35	0.21	6±4	
	Grassland	0	-	0	
Spotted Deer	Natural forest	0.28	0.14	14±7	16
	Plantation	0	-	0	
	Grassland	0.49	0.28	2±1	
Gaur	Natural forest	5.01	2.51	250±125	350
	Plantation	4.76	2.71	86.49	
	Grassland	3.12	1.10	14±5	

Average approximate sighting angle was 45°, giving a coefficient of 1.4, for use in King Census formula. Area traversed and percentage of sampling intensity is given in Table 3.

Observations and Results

Observation of the animals in the three different ecological types is given in Table 4. This is based on the observations on two days. The maximum number of animals sighted during a particular day in an ecological habitat zone was considered as the number of the species in that particular habitat. The density of the population was determined by using King Census formula.

$$\text{Density} = \frac{\text{Number of animals}}{\text{area}}$$

$$= \frac{\text{Number of animals}}{2 \times \text{Transect Length}}$$

$$\times \text{Mean Perpendicular distance}$$

$$\times 1.4 \text{ (coefficient)}$$

The density of animals (number per km²) is given in Table 4.

Amongst the herbivores studied, Gaur was dominant, followed by Wild Boar and Barking Deer. The population of Spotted Deer and Sambar is very low in the P.A. The high density of all six species was found to be in the natural forest. In the plantation, Gaur is the main mega herbivore. In the grassland, density of Gaur and Wild Boar is significant. The census operation was carried out in the month of April (dry season) in the morning hours. During this time, most of the herbivores took shelter in the natural forest, which may be the reason for higher density of the studied species in the natural forest in comparison to other habitats.

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SUMMARY

The first population estimation of six main herbivorous species, viz. Gaur, Wild Boar, Barking Deer, Spotted Deer, Hog Deer and Sambar was carried out in Garumara National Park, West Bengal after dividing the P.A. into three major ecological habitat zones - grassland, plantation and natural forest. Direct sighting of animals was recorded and density of the population was determined. An area of 27.7 km² was surveyed out of total area of 79.44 km². The study indicates good density of Gaur and Wild Boar in the P.A. and relatively low density of Sambar and Spotted Deer.

पश्चिम बंगाल के गोरुमारा राष्ट्रीय उद्यान में कुछ तृणभोजी वन्य प्राणियों
की संख्या का प्रथम आंकलन

नीरज सिंघल व अरुण मुखोपाध्याय

सारांश

गोरुमारा राष्ट्रीय उद्यान, पश्चिम बंगाल में छः मुख्य तृणभोजी वन्य प्राणियों - गौर, जंगली सुअर, काकर, चीतल, पाड़ा और सांबर की संख्या का प्रथम आंकलन करने के लिये सम्पूर्ण उद्यान को घास क्षेत्र, रोपवन तथा प्राकृतिक वन में विभाजित किया गया। वन्य प्राणियों की संख्या का घनत्व प्रत्यक्ष दर्शन द्वारा निर्धारित किया गया। राष्ट्रीय उद्यान के कुल 79.44 वर्ग किलोमीटर क्षेत्रफल में 27.7 वर्ग किलोमीटर क्षेत्र का सर्वेक्षण किया गया। इस अध्ययन से प्रमानित होता है कि गोरुमारा राष्ट्रीय उद्यान में गौर और जंगली सुअर का बाहुल्य है तथा सांबर व चीतल की संख्या अपेक्षाकृत कम है।
