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STATUS OF ASSAMESE MACAQUE, *MACACA ASSAMENSIS* IN DARJEELING DISTRICT, WEST BENGAL, INDIA

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INTRODUCTION

Field studies on the status and ecology of Assamese macaque were carried out earlier by Southwick *et al* (1964), Khajuria (1962), Fooden (1971b), Tiwari and Mukherjee (1992). Mukherjee *et al* (1995) surveyed in some parts of Darjeeling. Recently the Indo-U.S Primate Project carried out the status and behavior study of this species in northeastern India (Annual Report 05, 1999).

The field surveys of Assamese macaque of Darjeeling district were conducted during May and December 1997. The objective of the study was to survey all habitable areas (except Mahananda Wildlife Sanctuary) of the district to collect information on abundance, distribution, social structure & status of this species. The Assamese macaque (*Macaco assamensis*) allopatrically occupies this hilly district but sympatrically with the rhesus macaque (*Macaca mulatta*) at the lower elevation, below 150 m. This species is relatively larger than rhesus macaque. Its geographical distribution extends over a large area of south and south-east Asia from Nepal, Bhutan, Northeast India, Bangladesh, North Myanmar, South China, Laos, Thailand and Vietnam. It mostly inhabits the Sub-tropical, broad leaf forests and at middle elevation. They are also found in cultivated areas with fringe forests. At places its range of distribution overlaps with *Macaca mulatta*, *M. arctoides*, *M. nemestrina* and *M. thibetana*.

ECOLOGY OF THE STUDY AREA

Darjeeling district lies at the northern part of West Bengal, extending from 26°33' to 27°13' N latitude and between 88°2' and 88°56' E longitude with a geographical area of 3148 sq. km. The major part of the district is in the eastern Himalaya, having the area extending over an elevation of about 200 m at Reang in the Teesta valley to nearly 3800 m elevation near Sandakphu and Phalut.

The climate varies considerably due to altitudinal variation. The mean maximum and minimum temperature during winter are 08.3°C and 1.6°C respectively, while the mean maximum and minimum temperature during summer are 18.9°C and 4.5°C respectively. The district also gets snow in winter. The monsoon extends from the month of June to September and the rainfall is heavy with an average rainfall of about 2812 mm. The major crops are rice, wheat, maize and tea. The district is well connected with other parts of the state by road and rail. The main rivers are Teesta and Mahanada.

The forests are of mixed type from riverine to Oak-Hemlock forests. The vegetation cover of the district is about 46.28% of which 29.63% dense covese, 11.8% open forest and rest are plantations. The configuration of the mountains and winds from the south greatly influence the characters of the vegetation from place to place. In the lower hill forests, Sal (*Shorea robusta*) is the dominant tree with its principal associates being *Schima wallachii*, *Terminalia belerica*, *Terminalia crenulata*, *Sterculia villosa*, *Pinus longifolia*, *Amoora rohituka*, *Michelia campaca* etc. On the upper ridges *Cryptomeria japonica* is the predominant tree with other species like *Michelia excelsa*, *Buchlandia* sp., *Acer campbellii*, *Castnopsis hystrix*, *Alnus nepalensis*, *Michilus gamaniieana*, *Tsuga brunonians*, *Betula utilis* and *Rhododendron* sp.

METHODS

The survey was conducted on roadside and on the forested areas. Three to four observers were involved in the survey. The forest roads and trails were surveyed both on foot and on vehicle. Transect and point methods were applied to locate the monkeys. The transect method in the forest road was accomplished by slowly walking and waiting for 5-6 minutes every 200 m for visual and auditory signals of the presence of monkeys. The point method was adopted at many places of the study area where the range of elevation was 150-400 m. The surveys conducted mainly in the forenoon (0700 to 1100 hr) and afternoon (1500 to 1730 hr) in summer and during the whole day in winter. A total of 220 hours was spent for census work and all the groups were rechecked and the hours logged on recheck was not mentioned here. The groups once located; their social structure, habitat, inter and intra group interaction were recorded. The individuals of a group were classified as adult males, adult females, juveniles and infants. One year of less than three years old individuals were classified as juveniles and individuals carried by their mothers, preweaned and less than one year old were regarded as infants.

RESULTS

Nearly 543-km road was surveyed, including forest road and foot trails, and 42 groups of Assamese macaque were recorded. Areas surveyed and the distributions of monkeys are shown in

Fig. 1. The distribution and social composition are given in Table 1. The 42 groups contained a total of 574 monkeys with an average group size of 13.6 individuals of which 2.3 were adult males, 6.3 adult females, 2.8 juveniles and 2.2 infants. The group size varied from 2 to 43 individuals. Out of 574 monkeys the percentage compositions were 16.6% adult males, 46.3% adult females, 20.7% juveniles and 16.4% infants (Table 2). Assamese macaque in Darjeeling had more juveniles than infants in the population. Ratio of adult male to adult female was 1 : 2.8 and adult female to infant was 1 : 0.35, the ratio of females to combined population of juveniles and infants was 1 : 0.8.

The Darjeeling district has four sub-divisions. The Siliguri sub-division was devoid of Assamese macaque and was replaced by rhesus macaques. The other three sub-divisions *viz.* Kurseong, Kalimpong and Darjeeling contained the entire population of Assamese macaque.

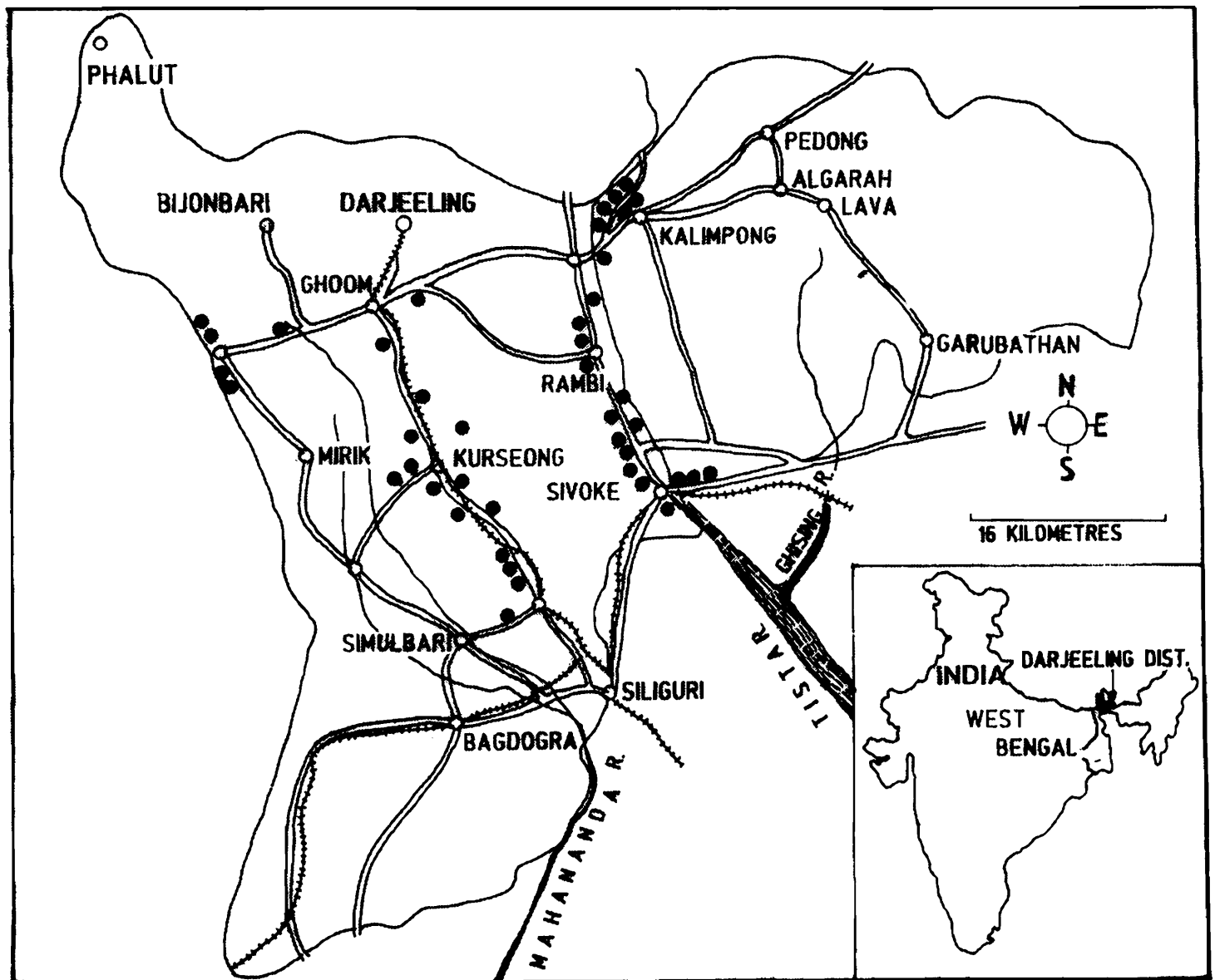


Fig. 1. : Distribution of Assamese macaque in Darjeeling district.

Table 1. Group size and composition of Assamese macaque at Darjeeling district.

Sl. No.	Location	Total Male	Adult Female	Adult	Juvenile	Infant
1	(Kurseong sub-division) 4 km north of Sukna to Rongtong	3	1	1	1	—
2	17 km milestone, 7.5 km north of Sukna to Tindharia	16	2	6	4	4
3	8.5 km north of Sukna	9	2	4	2	1
4	Mahanadi	43	6	19	8	10
5	Lakshmi Jhora, 2.5 km south of Mahanandi	10	1	4	2	3
6	Upper Paglajhora	23	3	10	7	3
7	1 km north of Kurseong	13	2	6	4	1
8	Dow Hill	24	4	12	6	2
9	3 km south of Makaibari T. Estate	5	1	2	2	—
10	Sepahijhora	12	1	6	3	2
11	Near Tung	2	1	1	—	—
12	Dhudhuwa, 2 km from Simulbari	7	1	4	1	1
13	(Kalimpong sub-division) Sevoke	6	1	2	2	1
14	Sevoke	9	2	5	1	1
15	1 km from Rly. Stn. on Sevoke	13	2	6	3	2
16	1 km from Sevoke to Bagrakote	20	3	10	5	2
17	2 km from Sevoke to Bagrakote	3	1	2	—	—
18	9 km north of Sevoke	19	3	8	5	3
19	29th Mile	7	2	2	2	1
20	Jeil Khola	5	1	3	1	—
21	2 km south of Melli, Kurseong beat	25	4	11	6	4
22	Chitrey	32	5	16	8	3
23	2 km from Chitrey to Melli	22	4	11	5	2
24	5 km from Chitrey to Kalimpong	15	3	7	2	3

Table 1. *Cont'd.*

25	Long Depot, Melli	26	4	10	7	5
26	1 km from Chitrey to Melli	8	2	3	1	2
27	Reang (Tarjon Jhora)	16	3	7	3	3
28	2 km south of Lohapul	17	2	8	3	4
29	Hanuman Jhora	3	1	1	–	1
30	2.5 km south of Berrick	16	2	7	2	5
31	Sweti Jhora	8	2	4	1	1
32	Andhrei Jhora	22	4	10	3	5
33	Tasading Beat, 2 km from Chitrey to Kalimpong	2	1	1	–	–
34	27th Mile, Reang to Sevoke	12	2	5	3	2
35	Reang, 7 km north of Reang to Teesata	14	2	7	2	3
36	(Darjeeling sub-division) Simkuna 3rd Mile on Jore Bungalow-Teesta Road, 5 km from Jore Bungalow to Teesta	14	2	8	2	2
37	3 km from Sukhia to Ghoom	10	2	5	1	2
38	2 km from Sukhia to Ghoom Manbhanmgyang road	2	1	1	–	–
39	Parmaiguri, between Khasmahal and FRH	19	3	9	3	4
40	Hima Falls	9	1	6	2	–
41	3.5 km from Ghoom Bhangyang to Bijonbari	11	2	5	2	2
42	6 km from Ghoom Bhangyang to Bijonbari	22	3	11	4	4
	Total	574	95	266	119	94
	Mean	13.6 + 1.38	2.3 + 0.2	6.3 + 0.6	2.8 + 0.3	2.2 + 0.2
	Percentage composition	–	16.6	46.3	20.7	16.4

The number of groups and their composition in the different sub-divisions are shown in Table 2. The other species, *viz.*, rhesus macaque occupied the lower elevation except two groups, one observed at Darjeeling town and other near Ghoom. The two groups now harbouring in Darjeeling and Ghoom might be translocated a few rhesus monkeys by the truck drivers or by road labourers moreover these two areas no assamese monkey was recorded. The Assamese macaque harbours at the higher altitude in the mixed forests of Sukna, Tindharia to Tung, Ghoom to Bijonbari, Sevoke to Teesta, Teesta to Melli on Kalimpong road. We failed to locate any assamese monkey in Takdah and Tarkhola during the survey as reported by Khajuria (1962).

A total of 167 monkeys in 12 groups were found in Kurseong sub-division, of which 25 were adult males, 75 were adult females, 40 were juveniles, and 27 were infants (Table 3). The group size varied from 3 to 43. The average group size was 13.9 individuals. The adult female proportion in the population was three times more than the males. The ratio of female to infant was 1 : 0.36.

Table 2. : Population composition of Assamese macaque and incidence of monkeys in the three Sub-divisions of Darjeeling district.

Sub-division	km. surveyed	No. of groups	Km. per group	No. of monkeys (sample size)	Average group size	Adult		Sub-adult	
						Male	Female	Juvenile	Infant
Kurseong	167	12	13.91	167	13.9	14.97	44.91	23.95	16.16
Kalimpong	214	23	9.30	320	13.9	17.50	45.62	20.31	16.56
Darjeeling	162	7	23.14	87	12.4	16.09	51.72	16.09	16.09
Total	543	42	12.92	574	13.6	16.60	46.30	20.70	16.40

Table 3. : Number of groups, composition and percentage variation of Assamese macaque in different sub-divisions.

Sub-division	No. of groups	Total number	Adult males	Adult female	Juvenile	Infant
Kurseong	12	167 (29.1%)	25 (4.35%)	75 (13.1%)	40 (6.96%)	27 (4.7%)
Kalimpong	23	320 (55.75%)	56 (9.75%)	146 (25.43%)	65 (11.32%)	53 (9.23%)
Darjeeling	7	87 (15.15%)	14 (2.44%)	45 (7.84%)	14 (2.44%)	14 (2.44%)
Total	42	574 (100%)	95 (16.54%)	266 (46.37%)	119 (20.72%)	94 (16.37%)

In 167 km road surveyed an equal numbers of monkeys were recorded at Kurseong sub-division with 1 group in each 5.5 sp.km. and 1 monkey per linear km.

In Kalimpong sub-division 214 km road was surveyed which revealed the presence of 320 monkeys in 23 groups consisting of 56 adult males, 146 adult females, 65 juveniles and 53 infants. The group size varied from 2 to 32 monkeys with an average group size of 13.91. The percentage composition was 17.5% adult males, 45.62% adult females, 20.3% juveniles and 16.56% infants. The ratio of adult male to adult female was 1 : 2.6 and adult female and infants and juveniles were 1 : 0.36 and 1 : 0.44 respectively. The distribution of this species in the sub-division was recorded 1 group in every 3.72 sq.km. and 1.5 monkey per linear km.

In Darjeeling sub-division 87 monkeys were recorded in 7 groups at a stretch of 162 km road. These composed of 14 members in each category of adult males, juveniles and infants and the rest 45 were adult females (Table 3), with the average group size of 12.42 monkeys. The adult females in the population was 51.72% and the adult males juveniles and infants were 16.09% each. The adult male to adult female ratio was 1 : 3.21 and adult female to juvenile and infant ratio was 1 : 0.31.

The analysis of data regarding the percentage distribution of different members in each sub-division is presented in Table 3. The data revealed that the number of adult females dominate over-other categories in each group. The adult females were nearly three times the number of adult males and the infants were less than the juveniles. The infants were minimum in number in each sub-division., and the group size varied from 15.15% to 55.75%.

The sex ratio varied from 2.60 to 3.20 between adult males to adult females with a mean of 2.9 (Table 4). The ratio of infants to adult varied from 0.23 to 0.27 with a mean of 0.25 and the proportion of juveniles to adults were from 0.23 to 0.40 with a mean of 0.32.

Table 4. : Sex ratio and proportion of infants and juveniles to adults as also juvenile and infants.

Sub-divisions	Adult male/ Adults females	Infants/Adults	Juveniles/Adults	Juveniles/Infants
Kurseong	3.0	0.27	0.40	0.67
Kalimpong	2.60	0.26	0.32	0.81
Darjeeling	3.21	0.23	0.23	1.0
Mean	2.9	0.25	0.32	0.82

DISCUSSION

The present survey revealed that the Assamese macaque distributed from 600 m to 2120 m. Mukherjee *et al* (1995) recorded 156 monkeys in 12 groups with an average group size of 13 individuals. Tiwari and Mukherjee (1992) in 1978 census sighted 156 individuals of Assamese macaque from the district. The present study revealed that the population of this species has increased considerably over a period of 15 years but the average group size remains almost the same. Mukherjee (1985) recorded the largest group size was 21 individuals with majority of the groups varied from 11 to 13 monkeys. During the present census, out of 42 groups, 16 groups contained less than 10 monkeys and the largest group was with 43 individuals. The rhesus monkey (*Macaca mulatta*), which was also recorded from the district, but confined in lower elevation from 150 m to 500 m, only 2 groups were noticed at the higher altitude. The Assamese macaque and rhesus macaque both inhabit in lower elevation at Sevoke and adjacent areas but the home range of two species did not overlap.

The Assamese macaque inhabits mostly on the roadside at Darjeeling district (except in Siliguri sub-division). Mukherjee *et al* (1995) recorded an average of 1 group in every 36.42 sq.km in the study area, whereas during the present survey 1 Assamese macaque group was recorded in every 12.9 linear km and 2.6 monkey per sq.km. This indicates that the population of this species has increased at Darjeeling district. Though the monkeys invade the terrace cultivation and vegetable gardens but there is no report of killing. The Nepali people constitute the 90% of the population at Darjeeling and they are more tolerant to monkeys and this may be one of the reason for the viable population in this region.

SUMMARY

The Assamese macaque is one of two monkeys species found only in this hilly district of West Bengal. The present data based on the survey conducted during summer and winter months of 1997 at an altitude of 160 m to 2123 m. A total of 42 bisexual groups were located on the roadside and in the forested areas. The 42 groups contained 574 monkeys with an average of 5 monkeys per sq. km. distributed in the district excluding sub-division of Siliguri. The population consisted of 16.6% adult males, 46.3% adult females, 20.7% juveniles and 16.4% infants.

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