

7. SOCIAL ORGANIZATION

7.1. INTRODUCTION :

There are two main aspects of living patterns in the animal kingdom. Some animals have a tendency to live in groups or herds while others lead a solitary life. Sometimes both the patterns are found in the same species at different times of the year.

Individuals of different age and sex classes of a population living together form a social association. Study of social organization deals basically with the significance of grouping of individuals (Lowie, 1950). Ecoethological factors such as reproductive and parental state of a population (Darling, 1937), climate, vegetation and food availability (Jarman, 1974 ; Sinclair, 1974) governs the organization pattern.

The objectives of this part is to find out the size and composition of group and nature of its stability.

7.2. METHODS :

Information regarding social organization of animals was gathered by recording age, sex and number of individuals in each category constituting of the groups. Only those groups whose age and sex composition could be established clearly were considered. Emphasis was given on individual identification of at least some group members to evaluate the cohesiveness of the group and to facilitate group identification.

7.3. RESULTS AND DISCUSSION

7.3.1. Types Of Group :

It was observed that in rhesus colonies there were a variety of social forms and

as such it is necessary to define the different association patterns. Four types of associative patterns were found and they are defined as follows :

(I) Male Dominated Group :

It is characterised by the presence of a dominant adult male with adult females juveniles and infants (Plate-7.1).

(II) Female Dominated Group :

It is comprised of a dominant female with subordinate and peripheral males, juveniles and infants. (Plate-7.2).

(III) Pair Group :

Association of one adult male and one adult female (Plate-7.3).

(IV) Solitary :

A lone individual mostly an aged male (Plate-7.4) who usually follows or associates to a particular group either of the first or second category. It is likely that the loner was a regular member of the group that it associate, with.

During the study period a total of 430 groups were recorded of which 299 (69.53%) were male dominated groups , 77 (17.9%) were female dominated groups, 39(9.0%)were dyads and only 15(3.48%) were solitary males. The total number of animals in different group categories were 13,428 ; 3,486 ; 78 and 15 respectively, totalling to 17,005 individuals. Out of 17,005 animals sighted 4,114 (24%) were seen in May and 4,976 (29%) in June suggesting that May-June to be the peak activity period of rhesus at Baikunthapur Forest . Percent sightings were moderate in February, March, April, i.e., 1680

(10%), 2,070 (12%) and 2,345 (14%) respectively. Male dominated groups were observed in all the months throughout the study period whereas female dominated groups were found in all the months except July and August (Figure -7.1). Thus rhesus groups are mainly male dominated groups. Mandal (1964), Mukherjee and Gupta (1965) and Ojha (1974) stated that in rhesus populations all the groups are multimale.

The males were observed to take initiative in forming groups as social units. The initiatives often involve 1 or 2 rival adult males leaving the groups along with 1-2 adult females with their infants and juveniles. This type of desertion to begin with is often temporary so that they come back to the original group. But may ultimately lead to permanent dissociation from the group. Southwick et al., (1965) reported that grouping was mainly based on adult males activities. Lindburg (1971) reported that rhesus groups are not closed social units. Boelkins and Willson (1972) on the otherhand stated that young males took much more initiative in forming groups, particularly by 3 - 4 years old males. Solitary males were found during the months from March to June and dyads were mostly seen during January-June . Ojha (1974) observed solitary males occasionally in rhesus populations of Rajasthan. Mukherjee and Gupta (1965) also observed solitary males occasionally. All male as found in *Presbytis entellus* (Jay,1965), were not observed during study period.

The Japanese macaques leave their natal groups at 3 to 5 years of age and join other groups or become solitaries (Nishida, 1966 ; Sugiyama, 1976). Male Pig-tails leave their natal group at around 5 years of age and live as temporary grouped individuals, not yet as complete solitaries (Toru Ot, 1990). The males usually became complete solitaries at an older age. Boelkins and Wilson (1972) on the otherhand reported that Rhesus males left their natal groups at 3 to 4 years of age and formed new groups. The occurrence of female dominated groups is rather common. The females are stable members of rhesus (Wall and Luttrell,1986) and pig-tailed macaque groups (Toru Ot, 1990) . Neville (1968) noted complete absence of adult males in a group which is dominated by two adult females.

Dyads were observed from January to June in increasing frequency . A rhesus

dyad was observed to coexist peacefully with a group of langurs (Jay, 1965). This incipient association led to eventual formation of a stable and cohesive bond between the two adults of opposite sex.

7.3.2. Group Size :

In this study, group size ranged from 8 to 83 individuals with an average of 39.4 ± 1.278 ($n=430$). A census of 132 groups in 1987 revealed that the average groups size in different category with the following composition : 20.77 ± 0.90 , small group ; 35.38 ± 2.04 , medium group and 63.3 ± 0.87 , large group (Table - 7.1). The data of present study is comparable to that in the forests of northern Uttar Pradesh, where group size ranged from 8 to 98 individuals with an average of 32 in 14 groups (Lindburg, 1971). Report on group size of rhesus by different workers varied to some extent such as Southwick (1960, 1962); Southwick and Siddiqi (1966, 1968 and 1970); Southwick, Beg and Siddiqi (1961); Southwick, Ghosh and Louch (1964) reported that average group size varies from 11.3 ± 1.4 to 49.8 ± 5.8 and number of adult males, from 2.6 ± 0.4 to 7.9 ± 0.9 . Group size is small in road sides (11.3 ± 1.3) and larger in forests (49.8 ± 5.8).

Several large groups were seen in the present study during May and June every year. They were, however, seen only during peak feeding hours (i.e., 17.00 hour to 19.00 hour). The largest such group observed was of 83 individuals containing 20 males, 30 females, 18 juveniles and 15 infants. The smallest group observed was of 8 individuals with 2 males, 3 females, 1 juvenile and 2 infants. Groups of various sizes i.e., large, medium and small of 17 to 100 individuals were observed by Neville (1968), Mukherjee (1969), and Prakash (1958, 1962). Puget (1971) observed group size in Rajasthan comprised of 90-180 individuals which is larger than baboon groups in Africa. In *M. assamensis* group size ranged from 10 to 50, as reported by Carpenter (1942), Southwick and co-workers (1964) and Fodden (1971) in *M. sinica*, the group size ranged from 8-43 individuals (Dittus, 1974), whereas in *M. silenus* it ranged from 6 to 34 Individuals (Green and Minkowski, 1977). In case of *M. nemestrina*, the group size varied from 8-81 individuals

(Ot 1990), whereas in case of langurs, it ranged from 5 to 120 (Jay, 1965) with an average of 12.8 to 37.0 for small and large size groups respectively (Oppenheimer, 1977).

Occurrence of different types of group with varying number of individuals tend to indicate that there is possibly not much stability in group size and structure, i. e., social organization is characterized by sub-groupings based on adult males. A subgroup by definition is a social association within a group that is more stable than temporary aggregation. Temporary association occurs primarily but not exclusively between members of a group. Large groups were probably temporary association of smaller groups induced by scarcity of food, water, cover or predator pressure. Forests often include patches where the same or a few preferred food species grow together (Whitemore, 1984). Such large patches when come to foliage, bloom or fruit together so as to form abundant food source at least seasonally are often capable of inducing formation of large groups. Toru Ot (1988) observed several groups of *M. nemestrina nemestrina* in west Sumatra to temporarily associate to several patches of favourable feeding sites..

7.3.3. Group Composition :

It is obvious from Table -7.2 that the group size and composition are rather stable in different years during the study period. The average percent composition of different age-sex classes during 1987-1989, are adult male : 24.7%, adult female : 37.7%, juvenile : 22.1% and infant 16.1%. Like most other macaques for example, *M. fascicularis* (Southwick and Cadigan, 1972) *M. radiata* (Sugiyama, 1971) and *M. nemestrina* (Toru Ot, 1990) the size and composition of rhesus group is to some extent fluid in nature with members joining and parting freely at different times. Normally, the young adult males participate actively in social relationships, i.e., sub-grouping. A few cases of association and dissociation of groups were observed during the study period.

7.3.3.1. Sub-Grouping Activity :

Southwick et al., (1965) stated that rhesus macaques tended to spend most of their time in a multi-male 'bisexual' group. Three observations recorded on the reorganization of groups leading to new groups formation are presented below :

Case -1 : On November 18, 1987 one group in the Basanti Basti of Laltong Block consisting of 7 males, 13 females, 6 juveniles and 6 infants segregated into three smaller sub-groups (Table -7.3). The original group was observed to maintain its integrity as a single unit from October 5, 1987 to November 11, 1987. The smaller units maintained themselves as cohesive separate units throughout December 1987 to January 5, 1988.

Case -II : At the beginning of breeding season at Laltong block 20 groups were observed. The groups maintained their integrity starting from non-breeding season upto the initial period of breeding season. As breeding season advanced and mating activities including copulations started, on November 22, 1988 two of the 20 Laltong groups were found in a state of disorder as evidenced by increased level of overt aggression including lot of chasing, jumping, vocalization and chaos. Soon one new group say Nfg., came into existence, formed from the original two groups, i.e., say GA and GB (Table - 7.4). The newly organized groups moved separately in the same general area in the Laltong Block but had separate resting spots. Each group had a new composition and travelled separately maintaining considerable distance from one another. At the time of group fission one adult female of GA, was seen to copulate with two adult males of GB and the trio often moved separately from both the groups. Soon several members of GB joined the consort trio and moved with them. Thus a new group Nfg., was formed which became stable as a group by the end of January, 1989. Table-7.4 indicates that the groups GA lost only one adult female and a juvenile which joined the newly formed group later on. The juvenile may or may not be related to the GA adult female. On the otherhand GB lost two adult females with infants and two juveniles. The sub-group Nfg., was thus formed by dissociation of adult and sub - adult member from both GA and GB. It is likely that the two GB juveniles were

offspring of the two GB adult females.

Case - III : On November 5, 1989 at Phuljhora Block , a large group consisting of 15 males 31 females, 18 juveniles and 18 infants dissociated into three groups (Table - 7.5). The second group segregated further into two groups on December 10, 1989 , so that four groups came into existence.

Initiation of immigration into and emigration from the groups are mostly done by male members among most macaques. The females usually follow the consort males along with infants later on. Seyfarth (1980) reported that females are most stable members of the groups in rhesus monkey. Again Wall and Luttrell (1986) stated that females formed relatively strong social bond within a group. Formation of new group by fission from existing ones has also been observed in Japanese macaque (Toru Ot, 1988) , and in Pig-tailed macaque (Caldecott, 1986 ; Robertson, 1986), in *M. silenus* (Sugiyama, 1968). Southwick , Beg and Siddiqi (1965) stated that sub- grouping in rhesus monkey was a prominent feature of their social organization. In the present study, the pattern of formation of subgroups varied among the groups. So, it can be noted that sub-grouping occurred due to certain socio-demographic factors and such subgroups incurse of time may reorganize themselves into definite groups.

7.3.4. Interaction With Other Species :

The rhesus macaques have altruistic interactions with several other mammalian and non-mammalian species, such as human, langurs, spotted deer (*Axis axis*) and several avian species. They are, however, susceptible to predation by pythons, tigers and leopards and may be harassed and occasionally killed by dogs (*Canis sp.*). They live peacefully with langurs (*Presbytis entellus*). However, because of destruction of natural forest, by human beings they have been forced to come and live in close contact with human habitations. This situation is tolerated by certain religious communities such as the Hindus, and Buddhists, however, traditional beliefs are under strain and may break down under

continued pressure due to increasing human density and economic loss caused by rhesus monkeys. Although rhesus macaques are rarely killed by the Hindus and Buddhists, they are subjected to a great deal of harassment by throwing rocks, arrows, and by shouting. Some tribals are known to kill and consume monkey flesh.

7.3.4.1. Reptiles :

Interactions with reptiles have also been observed but only on a few occasions. In a few cases interaction between rhesus and python (*Python molurus*) was found. On one occasion a python was seen to climb up the upper branches of a tree as a result all the macaques present on the tree hurriedly jumped on the nearest tree. On another occasion a python caught a juvenile and swallowed it. In the Sundarbans, the macaques are reported to have terrestrial, arboreal and aquatic predators in the form of tigers, pythons, estuarine crocodiles and sharks (Mukherjee and gupta, 1965).

7.3.4.2. Birds :

The interactions among birds and rhesus ranges from mutual attacks of varying intensity, to symbiosis. On several occasions, rhesus monkeys have been observed to stay close to owls. The rhesus monkey and peafowl (*Pavo cristatus*) associate with each other on the ground or on the tree and respond to each others alarm calls and movements. Sometimes crows (*Corvus sp.*) disturbed monkeys for food. One unidentified species of bird has been observed to peck on an infant but was deflected by an adult male of the group. Great noisy sounds are commonly heard when monkeys and birds coexisted on a tree. This noisy sounds on occasions helped me in tracing the presence of monkeys, during the study period.

7.3.4.3. Mammals :

7.3.4.3.1. Ungulates :

Spotted deer (*Axis axis*) were often seen close to or beneath the trees when the rhesus macaques were up in the canopy. The two species respond to each others alarm calls and seem to derive benefits from each others predator locating ability. The deer also benefited much by consuming fruits and leaves that the monkeys dropped to the ground from the upper branches. Sambar (*Cervus unicolor*) and domestic cattle have also been seen to feed near the rhesus macaques groups. Mandal (1964) found playful interactions between rhesus and spotted deer in the Sundarbans. Sambar and domestic cattle also respond to the alarm calls of rhesus.

7.3.3.3.2. Carnivores :

The smaller carnivores were found to interact with rhesus. The smaller carnivores such as mongoose (*Herpestes sp.*) were observed to feed peacefully nearby the monkeys, but the presence of larger carnivores causes a great deal of alarm among the rhesus monkeys (Champion, 1929). Though interactions between larger carnivores and rhesus monkeys was not observed but information about it were obtained through forest officials and forest dwelling villagers. Within the geographical range of rhesus monkeys, tigers (*Panthera tigris*), leopards (*Panthera pardus*) (Plate-3.8) and wild dogs as well as domestic dogs (*Canis sp.*) are present in the Forest of the study area. Leopards are said to be a principal predators of rhesus macaques. Rhesus are killed and eaten by tigers too but most often are eaten by leopards. The most frequent harasser and occasional killer of rhesus monkeys are wild as well as domestic dogs. The dogs often chased the monkeys and threatened them by barking. Aggression between adult males of rhesus and dog was found. Most of the dog-monkey interactions occurred when the monkeys were raiding crops in the field. Mutual interactions such as eating resting and grooming between dog and monkey were also observed.

7.3.4.3.3. Other Primates :

Rhesus monkeys appeared to interact peacefully with langurs the only other primate found in the present study area. Only few groups of hanuman langurs (*Presbytis entellus*) were observed in the study site. The langur groups appeared to be dominated by the rhesus groups without any obvious conflict. Rhesus and langur groups did not move together but often used the same forest area, water sources and same trees at different times. The langurs maintained considerable distance from the rhesus groups but followed them carefully. Plate-7.5, shows four in a tree which was previously used by a rhesus group. The langur groups were specially found at the breeding time of rhesus monkey.

Sugiyama (1967) found rhesus macaques and langurs in an intermixed state and they also travelled together throughout the day. Southwick et al., (1965) found rhesus groups to dominate the langurs. Jay (1965) observed that both the species fed peacefully in the same area at the same time. At Jodhpur (Molnot, 1974) and (Jay, 1965) found an outcasted adult rhesus monkey to live in a langur group.

The relationship with man (*Homo sapiens*) is more complex and varied. Rhesus monkeys were considered sacred by the Hindus probably because the sacredness of Hanuman (langurs) has been generalized to all monkeys. Tolerance of rhesus monkeys by man is greatly influenced by traditional beliefs and till date continue to ensure survival of the rhesus monkeys in most parts of India. However, certain human activities such as destruction of forest in order to increase agricultural land and to obtain firewood has forced rhesus to come in increased contact with man and to become more dependent upon the food of man in order to survive. The increased contact between man and rhesus may cause transmission of diseases from one to the other. Thus ultimate survival of the rhesus macaques also depends upon man's capacity to control its own population and his tendency to destroy natural resources.

Table - 7.1 : Different group sizes of rhesus at Baikunthapur Forest Division for the year 1987.

	Small Group	Medium Group	Large Group
No. of Groups(n)	65	44	23
Adult Male	5.4 ± 0.23	8.9 ± 0.63	14.4 ± 0.28
Adult Female	8.4 ± 0.39	12.3 ± 0.76	24.3 ± 0.44
Juvenile	3.8 ± 0.18	8.5 ± 0.52	12.9 ± 0.24
Infant	3.25 ± 0.21	6.08 ± 0.29	11.5 ± 0.23
Total	20.77 ± 0.90	35.38 ± 2.04	63.3 ± 0.87

N.B. : Small Group = 8-20 individuals

Medium Group = 20-35 individuals

Large Group = Above 35 individuals

Table - 7.2 : Average group structure of rhesus at Baikunthapur Forest Division.

Year	Number of groups observed	Male	Female	Juvenile	Infant	Total
1987	132	9.7 (24.8)	14.6 (37.4)	8.4 (21.5)	6.3 (16.3)	39.2 (100)
1988	145	9.6 (24.4)	14.5 (37.2)	8.7 (22.2)	6.4 (16.2)	39.2 (100)
1989	153	10.0 (25.0)	14.4 (36.2)	9.1 (22.8)	5.9 (16.0)	40.0 (100)

N. B. : Numbers in parenthesis indicate percentage.

Table - 7.3 : Segregation of group consisting of 7 males, 13 females, 6 juveniles and 6 infants into 3 smaller subgroups.

Subgroup No.	Male	Female	Juvenile	Infant	Total
1	2	4	2	2	10
2	4	6	3	3	16
3	1	3	1	1	06

Table- 7.4 : Sizes and age-sex composition of two groups (GA, GB) during fission period.

	Before Fission Stage		After Fission Stage		
	Name of Group		Name of Group		
	GA	GB	GA	GB	*Nfg
Male	3	7	3	5	2
Female	7	13	6	9	5
Juvenile	4	5	3	3	3
Infant	4	7	4	4	3
Total	18	32	16	21	13

*Nfg = newly formed group.

Table - 7.5 : Segregation of a large group consisting of 15 males, 31 females, 18 juveniles and 18 infants into 4 subgroups.

Date of observation	Gr. No	Male	Female	Juvenile	Infant	Total
4.11.89	Gr. A	15	31	18	18	82
5.11.89	Gr. A1	3	7	5	6	21
	Gr. A2	9	18	9	10	46
	Gr. A3	3	6	4	2	15
10.12.89	Gr. A1	3	7	5	6	21
	Gr. A2(a)	3	7	4	3	17
	Gr. A2(b)	6	11	5	7	29
	Gr. A3	3	6	4	2	15

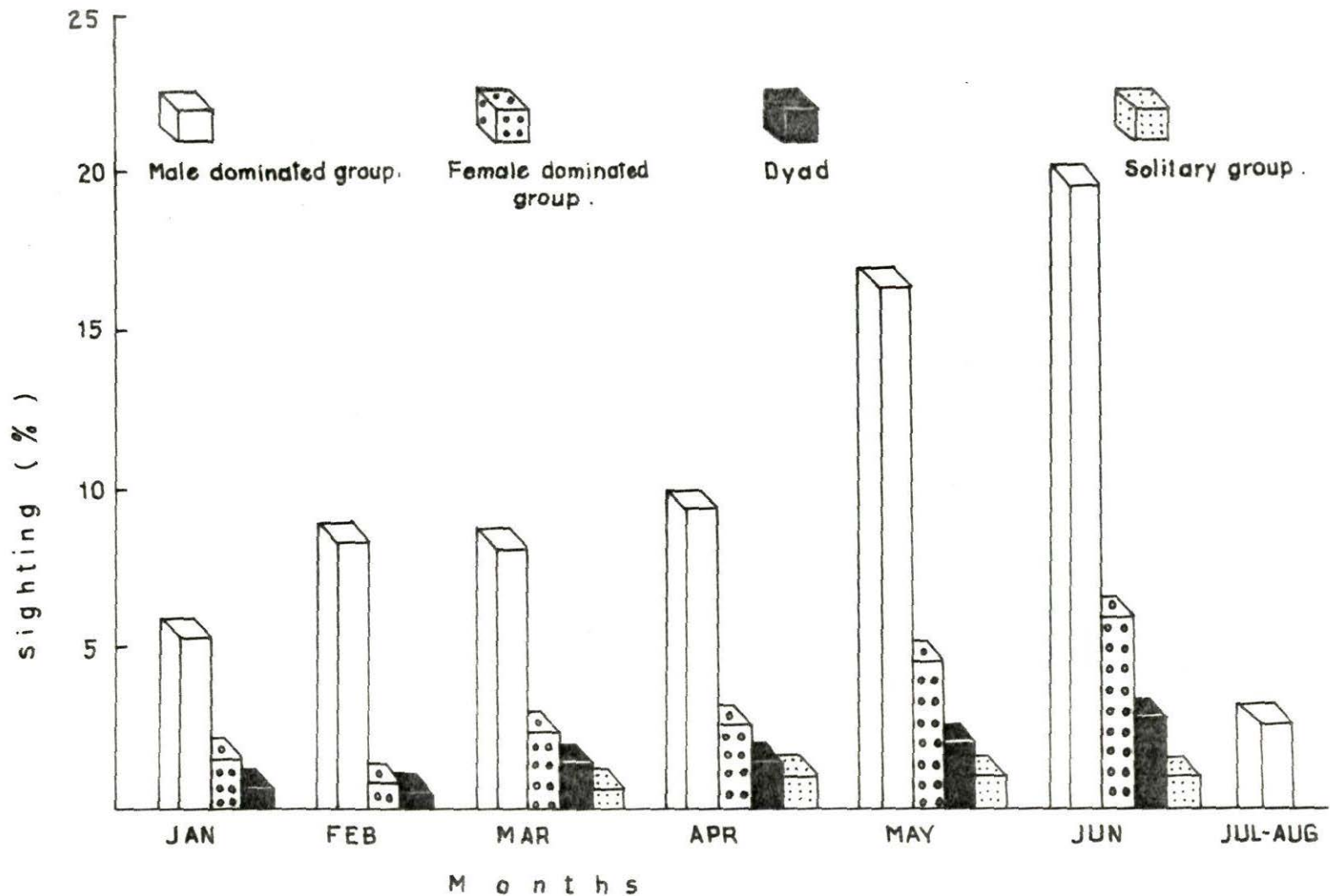


Fig. 7.1: Percent sight records of rhesus in different months for the year 1987-1989 at Baikunthapur Forest Division .

Plate - 7.1 : A male-dominated bisexual small group comprising of 3-adult males, 4-adult females, 2-juveniles and 3-infants.

Plate - 7.2 : A female dominated group consisting of 11 individuals.

Plate - 7.3 : A pair-group of one adult male and one adult female. Arrow shows adult male.



Plate – 7.1



Plate – 7.2



Plate – 7.3

Plate - 7.4 : A solitary male on the bridge of a river during midday at breeding season.

Plate - 7.5 : A small langur group consisting of four individuals on a tree which was previously used by a rhesus group.



Plate – 7.4



Plate – 7.5