Behaviour of Langurs and their Interaction with Human Beings at Khandagiri and Udayagiri Hills of Bhubaneswar, Orissa

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(web supplement)

Abstract

Langurs are wild animals which are one of the important groups of primates. Gray langurs are popularly known as entellus langur or Hanuman langur, which are scientifically named as *Semnopithecus entellus.* Two separate groups of langur inhabit at Khandagiri and Udayagiri hills located at Bhubaneswar, the capital of Orissa state. Although langurs are fond of plant materials as their food, now they are habituated with various food substances offered by tourists. The food is the only factor which makes them want to interact with human beings very closely. They maintain a systematic social life and show many intra - and interspecific behaviours. Their interaction with tourists is so friendly that it can hardly be differentiated from that of men. Although they stay at their natural hill forest habitat during the night, rain and adverse ecoclimatic condition, they prefer to spend time and interact with visitors and tourists during the day. A detailed behaviour and conservation measures of this endangered species is suggested.

Key words : Primates, Langur, Khandagiri, Udayagiri, intra and interspecific relationship.

Introduction

Primates are the most advanced order of the class Mammalia. The common Indian langur (*Semnopithecus entellus*) is a primate belonging to the sub-family Colobinae alongwith langurs and leaf monkeys of Asia and Colobus monkeys of Africa.The langurs are described under sub order Simiae, super-family Cercopithecoidea and family Cercopithecidae. They are commonly called as entellus langur or gray langur or Hanuman langur. The name "langur" is derived from sanskrit '*langulin'* which means "having a long tail". The epithet 'hanuman' comes from the monkey-god and loyal servant of King Rama in Ramayana. Sixteen sub-species of langurs have been reported over most of north India. In Indian sub-continent, they are found over most of north India and penisular India as far south as Cape Comorin (Kanyakumari). They also occur in Ceylon, Tibet, Java, Sumatra and Borneo.

Langurs generally inhabit within vegetation zone ranging from dry scrub with only occasionally low trees to thick wet forests. They also inhabit as high as 3300 meters above sea level in the foothills of the Himalayas and in the field of snow (Jay 1965, Hingston 1920). They are polygamous, diurnal and colonial in nature and spend 50-80% of their time on the ground. They are large, black faced and gray-bodied animals with long limbs and a tail longer than head and body. Eye- brows are well developed and adults have hairs behind the brows radiating from frontal whorl; crown hairs rise into a crest of tuft. Their body is silvery grey with black hands and feet. Indian langurs of various parts of the country have been studied by Jay (1962, 1965, 1968), Yoshiba (1967) and Ripley (1970). Upto 1975 common Indian langurs are studied by different observers at different places of India.

[w] See Images in the web supplement at www.zoosprint.org)

Methodology of Study

Two separate populations of langur at Khandagiri and Udayagiri hills were studied during March 2003 to March 2004 through census method. During observation, their behaviour, daily activities and demographic studies were taken up. Their home range was also observed. During the investigation information was collected from local people, different food vendors, shop keepers and priests of the Jain temple (located at Udayagiri). The langur groups of Khandagiri and Udayagiri are designated as 'K' and 'U' respectively.

Objective of the Study

Although data on the Indian langurs of various places in the country are available, no data are found on langurs of isolated pocket like Khandagiri and Udayagiri hills of Bhubaneswar, Orissa. The present study was undertaken to study their daily activities, social behaviour, feeding behaviour, reproductive behaviour including parental care and interspecific relationship tourists.

Study Site

Khandagiri and Udayagiri hills (20°17'N and 85°47'E) are two tourist places located at Bhubaneswar, the capital of Orissa (Fig.1[w]). Two hills are situated face to face at a distance of 20 feet through which a road passes from NH-5 to Chandaka Elephant Sanctuary. The caves like Queen's Cave, Elephant Cave etc. of the hills have two separate groups of langur populations living there as other sources of attraction for the visitors. At Khandagiri, the langur group remains at the rock steps approaching to the top of the hill (Fig.2[w]) whereas at Udayagiri, starting from the entry point through the rock steps they are seen upto the middle of the hill. These two hills are surrounded by human habitation and covered by various types of herbs, shrubs, bushes and trees (Table 1).Two separate populations of langur at Khandagiri and Udayagiri hills were studied during March 2003 to March 2004. During observation, their behaviour, daily activities and demographic studies ware taken into account. Their home range and territory were also observed. During the investigation information was collected from local people, different food vendors, shop keepers and priests of Jain temple (located at Udayagiri). The langur groups of Khandagiri and Udayagiri are designated as 'K' and 'U' respectively.

Results and Discussion

The langurs at the two hills maintain a systematic life (Table 2) whereas a few show slight deviation, that is, they do not follow the group in time. The population size of Khandagiri and Udayagiri was found to be 67 and 50 respectively during March, 2004 (Table 3). The behaviour is discussed under two different types such as intraspecific and interspecific. The intraspecific behaviour of langurs is noteworthy. Intraspecific behaviour such as social

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behaviour, feeding behaviour and reproductive behaviour including parental case were taken into account.

Social Behaviour

Behaviour like territorial, agonistic, grooming, relationship of adult male to juvenile male, male dominance, non-troop male occurrence and activities during festivals at the hill have been considered under social behaviour. Between 'K' and 'U' group, a strong territorial behaviour has been revealed. Members of both the groups are completely territorial and never interchange their home range. If by mistake a member of a group goes to the territory of the other, the intruder is immediately identified, attacked and driven out by the members of the other group.

Agonistic behaviour for food is common among the members of the same group. If one notices tourists with food, the langurs try to capture the entire lot of food material. While eating those food hurriedly, if they see other members approach for snatching, they sharply drive them out from their vicinity. Among the same group members, grooming between adult females and juvenile females, (Fig. 3[W]) and *vice versa*, adult and juvenile female and infants, juvenile female and juvenile male has been noticed. During grooming, they clean the insects and dust particles. from their own body as well as others by their fingers and lick off the the skin of others by folding or stretching. They also groom the head of the food vendors and tourists at times (Fig. 4[W]).

Interaction between late infants and early juvenile males and adult males is usually not seen. But the late infants and early juvenile males try to interact with adult males by embracing. For this purpose when they see the adult males they go near them and obstruct their path. Many a time they are expelled by the adult male and finally the adult males embrace them.

In both the groups potential male dominance has been noticed for food and mating. Non-troop male occurrence has been recorded in 'U' group where a single juvenile male has been found to stay away from the group, that is, in the deep forest of the hill. During scarcity of food, members of both the groups change their home range to Jagamara which is 2km east to the hills and Baramunda Bus Stand which is also 2km north from the hills. They often go to the south in search of food where human habitation is dense, but occasionally they also go to the west. A festival called "Magha Mela" is celebrated for 15 days at Khandagiri hill in winter. During these festive days the 'K' group spends their time entirely at the top of the hill because of the gathering of the human beings.

Feeding Behaviour

Langurs are used to take various types of food during day time. They take ground-nuts, bananas, grapes, biscuits, mixtures and breads offered by tourists. When they fail to get sufficient food from tourists, they migrate to human habitation and consume leaves of rose and China rose, flowers of rose, China rose and marigold, fruits such as guava, papaya and vegetables like brinjal, lady's finger and banana from the garden of the human habitat. They are also fond of taking the leaves, pods, flowers and fruits of different trees available at the native hills (Table 1). For drinking water, 'K' group uses three reservoirs out of which one is located at the banyan trees where they take rest at night and two others are near the left side of rock steps (Fig. 5[W]). They also use one small water reservoir located at the hill top. But 'U' group drinks from the six taps available at Jain temple and occasionally they use one large water reservoir located at the top of Udayagiri hill.

Reproductive Behaviour

During breeding period, the estrus females come closer to the males and solicit them by showing their hips to them. Mating occurs at the desire of the males and if it fails the estrus females are expelled out. During mating the male mounts over the female and holds the pectoral girdle of females by his hand. The female simply stands by keeping the tail to one side. Sometimes during mating when the juveniles and adult females chance upon the mating pair, they shout and jump around. Very often juvenile males mount over juvenile males, females and adult females. Parental care in langurs in observed to be extremely high. After birth the young are breastfed by the mother (Fig. 6[W]). Usually the infants cling to the mother's abdomen (Fig. 7[W]) even when the mother is running and jumping from one tree to another. During feeding, resting or leisure the baby may be taken care of by other females of the group. These females embrace, groom and kiss the baby. The adult and juvenile males hardly show any interaction towards the infants.

Human Langur Interspecific Relationship

The interaction between langur and human beings at Khandigiri and Udayagiri hills is noteworthy. The langurs have different behaviour with tourists, food vendors and local people. These two hills are always crowded by the visitors almost everyday. The tourist, during their visit offer food materials to langurs after buying from the vendors nearby. Sometimes the vendors request the tourists to buy food materials from them to offer to the langurs. The langurs are so adept in collecting food materials from the tourists that they are not afraid of the tourists. Langurs exhibit friendly relationship by holding the legs, hands and dresses of tourists to obtain food. During this situation, few langurs jump unto the shoulder or head of tourists and sit there comfortably (Figs. 8 and 9[W]). They sit until they get food materials. If the tourists do not have any food with them, they purchase and give it to langurs. In fact, langurs do not snatch food materials from local vendors since they are afraid of vendors. At this crucial play, the food vendors tactfully manage the situation by selling food stuff to the tourists and ask tourists to hand over the food to langurs. A few tourists who are not acquainted with such behaviour of langurs get scared. The langurs hardly attack or show aggressiveness towards the tourists but they do so if attacked or irritated by them. During visits some tourists also pray to the langurs by saluting, giving food and uttering Jay Hanuman, Jay Sriram and Jay Jay Ram (*i.e.*, praying to lord Sri Ram and his loyal servant, the Hanuman).

The langurs are so close to food vendors that they neither ask them for foods nor snatch food materials from the vendors. Few food vendors are so friendly to them that the langurs groom their head, sit on their shoulder and fool

around with them. The local people have enough sympathy and respect for the langurs. Although langurs destroy gardens, vegetables and fruits of the local people during scarcity of food, local people never attack the langurs. Instead they simply chase and drive them out from their garden. When bulls, dogs or cows enter occasionally into 'K' group territory, they never show any hostile reaction. However, if these animals share their food they produce typical sound like "khnring, khnring" and go away from the spot. A strong opposition has been observed to a rhesus monkey which was found to have been staying with them since few months.

Observation on the intraspecific behaviour like grooming parental care, false sexual mounting by juvenile males, sexual harassment by both juvenile males, females and adult females, potential male dominance, infants and juvenile males with adult male relationship and non-troop male occurrence (in 'U' group) corroborates with the recorded data (Jay 1962, 1965, 1968, Yoshiba 1967, Blaffer Hardy 1977). According to a Yoshiba (1967), Indian langurs exchange intertroop members. Sugiyama, *et al.* (1965) reported loose territorial feeling in common Indian langurs, but in the present study a strong and intensive territorial feeling between K and U group has been observed. Langurs usually do not accept the presence of human beings near their vicinity (Yoshiba 1967) but the langurs of Khandigiri and Udayagiri hills have an affinity towards human tourists in the hope of getting edible substances. Jay (1968) opines that langurs at Kaukori feed at high rate during morning and evening and the feeding rate decreases during mid day but present observations show that the peak feeding period of langurs is the mid-day while it decreases at evening and morning. Some naturalists record that langurs do not oppose macaque at Dharwar in their territory (Yoshiba, 1967).

Suggestions

The following steps may be taken for better and secured survival of langurs in the isolated pockets at the two hills.

1. A thick afforestation may be developed which must be the source of feeding of langurs so that they will remain within the forest and may not encroach upon the local human habitation.

2. A nominal fee (a rupee or two) may be collected from each tourist as entry fee which may be utilised for the development of greenery around the hills.

3. The tourists or food vendors should be strictly prohibited to give food to langurs so that the langurs will be habituated to take the natural plant products available in and around them.

4. State Government, Central Government, Central Zoo Authority and NGOs should give attention for their conservation and protection by which population of such precious species could be increased.

5. Mini zoo consisting of deer, some birds and reptiles may be developed for better tourist attraction and for the sustainability of the tourists.

6. Department of Science and Technology and Department of Environment and Forest, Orissa may send proposal for funding from DST, Govt. of India to develop these two hills for better habitation of langurs.

Table 1. Important floral plant diversity of Khandagiri and Udayagiri hills

	Local name	Common English name	Scientific name
1	Baula	Bullet wood tree (P, F and L)	*Mimusops elengi* L.
2.	Sita phala	Custard apple (P, F and L)	*Annona squamosa* L.
3.	Gandhana	Gandhana (L)	*Premna latifolia* Roxb.
4.	Kaluchia	Kaluchia (L)	*Diospyros sylvatica* Roxb.
5.	Sapeta	Sapota (F)	*Achras sopota* L.
6.	Kendu	Pergimmon (F and L)	*Diospyros melanoxylon* Roxb.
7.	Amba	Mango (L, F, P)	*Mangifera indica* L.
8.	Ankula	Ankula (L)	*Alangium salvifolium* Thw,
9.	Sapuri	Pineapple(F)	*Ananas comosus* Schuff. F.
10.	Giringa	Giringa (L)	*Pterospermum suberifolium* L.
11.	Kaju badam	Cashew nut (F)	*Anacardium occidentale* L.
12.	Nirasha	Iron wood tree (L)	*Memecylon umbellatum* Burm. F.
13.	Pijuli	Guava (L, F)	*Psidium guayava* Sabine
14.	Kaian	Tamarind tree (L, F, P and R)	*Tamarindius Indica* L.
15.	Nadia	Coconut	*Cocos nucifera*
16.	Tagara	Eastern Indian rosebay	*Tabernaemantana coronaria* Br.
17.	Bara	Banyan (R)	*Ficus benghalensis* L.
18.	Kaniara	Yellow oleander	*Thevetia peruviana* K. Sch.
19.	Sahada	Sahada	*Streblus asper* Lour
20.	Kochila	Strychnine/Nux vomica	*Strychnos nux-vomica* L.
21.	Baunsa	Bamboo	*Bambusa tulda* Roxb.
22.	Baigaba	Phsic nut	*Jatropha curcas* L.

* Letters in parentheses such as L, P and F indicate leaf, pod and flower respectively which are consumed by langurs.
** 'R' indicate the tree on which langurs take rest.

Table 2. Daily activities of langurs

Sl.No.	Time period	Activities	
		K group	U group
1.	5.30 to 6.00	Arrive from banyan trees, search food around shop sides, go to the top of the hill to drink water from reservoir	Arrive from different resting trees (especially tamarind) search food around shop sides and human habitations (jain colony), go to the Jain temple water tap for drinking.
2.	6.00 to 6.15	Come to the rock steps of the hill and on near by trees	Few come to the entry point of the hill and few go to local human colony
3.	6.15 to 11.00	Remain at the rock steps and also take rest on near by trees (fig 10) feed the leaves, tourists usually come after 9 A.M and starts giving food to them.	Few remain at entry point, few at rock steps and rest remain at the middle of the hill near queeen's cave. Get food material from tourists after 9 A.M
4.	11.00 to 15.00	Peak period of feeding.	No specific peak period of feeding but feed during these hrs from tourists, members from join colony come to the hill.
5.	15.00 to 17.00	Do not go away from the rock steps but feeding rate decreases.	The feeding rate remains as such.
6.	17.00 to 18.00	Both the group members leave from their respective places and roam with radius of about 100 meters. Most of them drink during this hour.	
7.	18.00 to 18.30	Few to all members of both group members came to their respective places and take a little food material from the tourists.	
8.	18.30	Go to the banyan trees (about 40 mtrs from the rock steps) to take rest.	Most of the member go to a little deep forest patch whereas few stay at Jain temple.
9.	19.00	After these hrs no body from both the groups take any food materials. But from 'K' group specific few members may take foods after 19.00 hrs.	

Table 3. Population of langur at Khandagiri and Udayagiri hills of Bhubaneswar, Orissa (March 2004)

Sl.No.	Group	Adults		Juveniles		Infants	Total
		Male	Female	Male	Female		
1	Khandagiri (K)	9	27	14	10	7	67
2.	Udayagiri (U)	5	22	9	7	7	50

Conclusion

Langurs are sociable wild animals. Their behaviour is similar to that of other primates and human beings in particular. Proper management, care and conservation strategies are desirable for the enhancement of their population at Khandagiri and Udayagiri hills since these two spots are ecoclimatologically sound.

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Acknowledgements
The authors gratefully acknowledge the Head, P.G. Department of Zoology, Utkal University and Dr. S. K. Dutta for encouragement. Thanks are also due to Mr Niladri Bhusan Kar and other students for their co-operation during the course of investigation and the Department of Tourism, Government of Orissa, Bhubaneswar for their assistance.

Jackal (*Canis aureus*) feeding on artificial food made of wheat grains in Thar Desert

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(Web Supplement)

Jackals live in almost any environment in humid forest country or in dry open plains, or desert. They have been found at height of 3600 m in the Himalayas (Prater, 1980). Though jackals are scavengers, but many times they hunt small animals in pair or in packs (Chhangani, 2000). They are also reported feeding on melon, sugarcane, bare (Prater, 1980).

On 14th September 2002, I was coming from village Khejarli (a Bishnoi village) some 25 km, southeast to Jodhpur. I was on the survey to assess the impact of drought on mammals in Luni tehsil of Jodhpur district. At about 9.30 p.m. after 2 km of driving by jeep on the way to Jodhpur from Khejarli, I saw a animal look like dog feeding on the road on some thing from a broken pitcher. I turned the light of jeep towards the animals, it was jackal. I took the jeep about 5 meters, close to the animal but the jackal did not run away and kept on continuously feeding. I took my camera out and took 4-5 photographs of the jackal feeding on the artificial food (Figure 1[W]). Suddenly one truck came from the other side and jackal ran away from the road. I came out from the jeep and went to examine the food eaten by the jackal. I was surprised to see the food; it was Lapsi (a local sweet dish made by broken wheat grains, butter and sugar). I observed jackal feeding on it about 5-7 minutes continuously, he must have been very hungry.

This change in feeding or adaptation in diet must be the main cause of the successful survival of jackals through out the Indian region. This may be also due to severe drought this year, because most of the livestock and cattle have migrated from the area. Therefore the scarcity of carcasses food forces them to feed on such vegetarian food.

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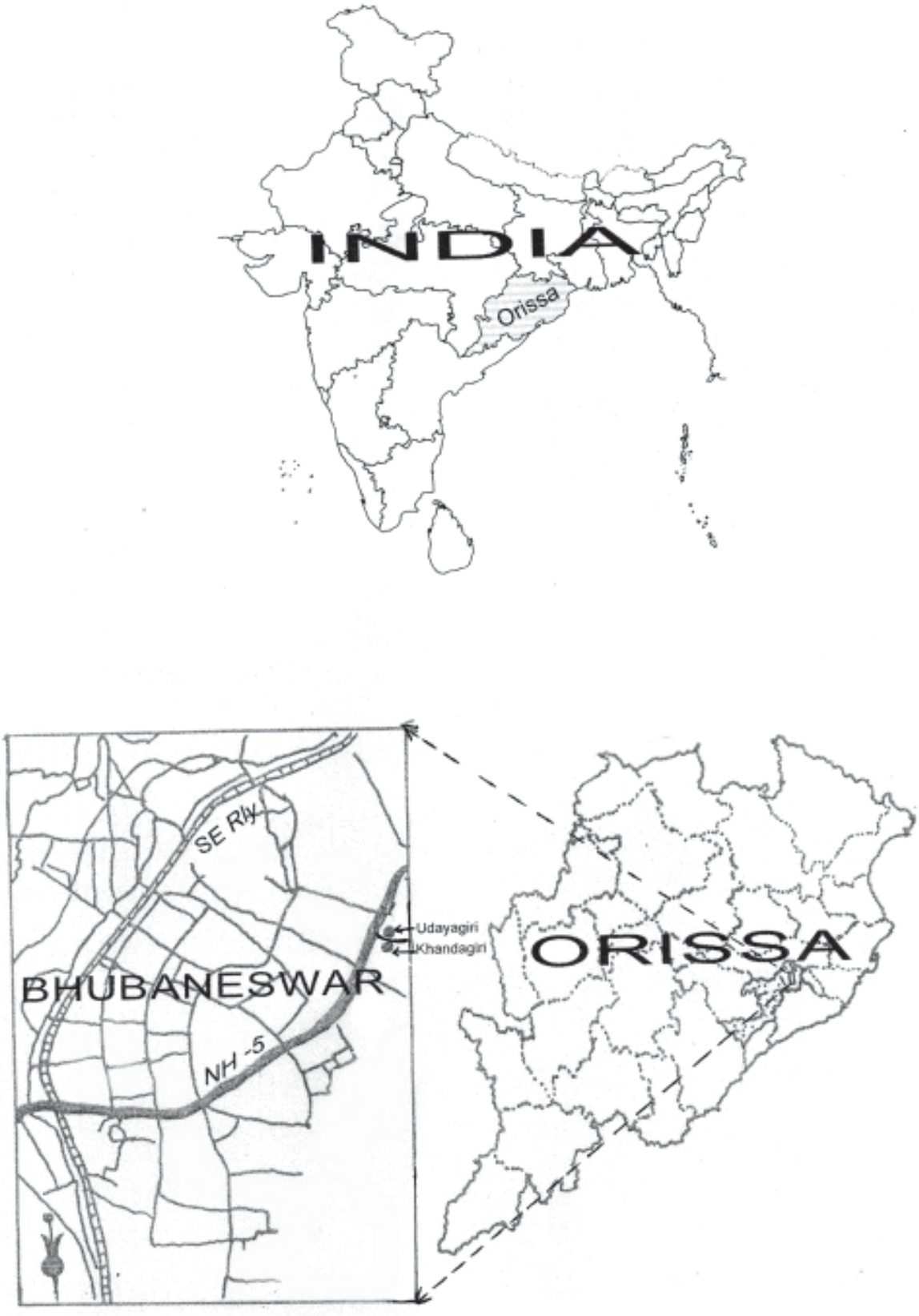

Fig.1. Present study site

Fig.2. Langurs in group on the rock steps of Khandagiri hill

Fig.3. Grooming of adult female langur to juvenile female

Fig.4. Proximity between vendor and langur

Fig.5. Langurs drinking from a tank at the bottom of the hill

Fig.6. Baby langur suckling from her mother

Fig.7. Parental care

Fig.8. Langurs appealing for food to the author (B. Patil) during observation

Fig.9. Friendly equation of langurs with tourists

Fig.10. Resting of langurs on a tree