

# Selection of Sleeping Sites by Hanuman Langurs in Chitrakoot Forest Range of Madhya Pradesh, India

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**Abstracts:** Selection of sleeping sites by Hanuman langurs (*Semnopithecus entellus*) were studied by in Chitrakoot forest range Madhya Pradesh India, from January 2012 to December 2012. For this study we selected three troops (two bisexual and one all male bands). The entire studied troop used large tree species, with have numerous branches straight trunk and dense canopy, for roosting. Total 16 plant species were used by langurs for sleeping site. During rainy and cold season the Hanuman langurs sleep in cave and old heritage building and temple. During rainy and cold season the Hanuman langurs sleep in cave and old heritage building and temple.

**Key words:** Hanuman langurs, altitude, troops.

## 1. Introduction

Langurs are leaf-eating, tree-residing, forest-dwelling monkeys. They are regarded as among the most arboreal of all Old World monkeys. They are active throughout the tree canopy and can be found in both primary and secondary forests

Langurs are one of the most fascinating non-human primates. Besides their importance in the fields of agriculture and medicine, the study of these animals has a close bearing on the understanding of human, social and psychological problems. The non-human primates are represented with 63 genera and about 600 species or subspecies in some 92 countries of the 25 species of these animals recorded from the Indian sub-continent, three, namely, the rhesus macaque (*Macaca mulatta*), the bonnet macaque (*Macaca radiata*) and the Hanuman langur (*Semnopithecus entellus*) have become urbanized (Rajpurohit, 2005). They occupy geographically vast areas and exploit diverse habitats ranging from thick forests to human-dominated landscapes and thus are considered 'least concern' species in India (IUCN, 2003). Recently, habitat loss and degradation through human encroachment, overgrazing, building roads through forests, lopping, deforestation, agriculture, fire, unavailability of food, predation by carnivores and attack of several viral and bacterial diseases

The Hanuman langurs are found in a wide range of habitats from desert edge to rainforest and mountain scrub at 4,000m. Because they are considered sacred there they are found even near urban areas in northern India, they usually only move on the ground when trees are scarce. They forage during the morning and late afternoon. The troop returns to the same sleeping tree every night. They sleep at the ends of branches, where it's hard for a large predator to get at them. Sometimes, they sleep in caves. They spend a lot of time foraging on ground, but prefer sleeping in the trees during night to protect themselves from predators. They produce various sounds like grunting, panting, honking, hiccups, rumbling, coughing etc to communicate and alarm other members.

## 2. Material and Methods

### 2.1 Study Area

The study site is situated in the border of Chitrakoot District of U.P. in North and East and partially West; while Majhgawan Range of Satna District of M.P. in South; Barondha Range of Satna District M.P. in West. Chitrakoot is the most historical and religious Hindu place of India, and surrounded by lush green hills of legendary Vindhya range. In Chitrakoot have many natural historical caves, streams, lakes and different types of flora & fauna. Therefore the Chitrakoot has been sacred place of worship for sages and hermits since antiquity. The general topography of Chitrakoot is hilly and undulating cut off by numerous rivers and rivulets. Chitrakoot is situated in the close vicinity of the tropic of cancer is land locked, so in this places a typical tropical climate condition occur. In Satna districts there are about 170201.46 hectare forest area. Out of them about 34% forest areas in Chitrakoot region. The forest area in Chitrakoot is mainly mixed. In this type of forest most of their trees remain leafless for several weeks in dry season.

### 2.2 Methods

We used visual focal sampling method to record on sleeping site of Hanuman langurs. With the help of direct observation method we identified their sleeping site and trees used by them and made a table in the field. Overall 15 plants species were utilized by Hanuman langurs during the study period. The focal groups periodically from morning till the time they settled on specific locations and by recording presence of fresh fecal pellets of langurs under such locations. Each focal group of Hanuman langurs was followed for three consecutive days each month from January 2012 to December 2012. Of the total 125 days, sleeping sites could be identified only on 28 occasions of monitoring of focal groups from morning till evening. On rest of the days, particularly during monsoon season, the observer lost the sight of focal groups and hence data regarding their sleeping sites could not be obtained. Whether or not the same sleeping site was used for consecutive nights could be discerned on the basis of the amount of faecal patches and characteristics of faecal

distribution. The geographical location of sleeping site was determined with hand held GPS and the height of trees used as 'sleeping sites' was measured with Hypsometer.

### 2.3 Study group

Initially, a thorough survey of Chitrakoot forest range was carried out and in all, 14 troops of Hanuman langur (13 Bisexual groups, & 1 all male band) were found. Of these, three groups, i.e., Kamtanath hill troop (S1), Hanumandhara Troop (S2) and Semariya turn Band (S3) were selected for the detailed study. The troops S1 and S2 were 'multi-male bisexual' troops while S3 was an 'all male' band. These troops inhabited different habitats within same range of climate, rainfall, topography, but different in altitude, plantation and with respect to human interference

and predator absence/presence (Table 1). The habitat of S1 and S2 troop was a mountain and forest area with human settlement and presence of temple but both are differ with respect of vegetation while in the case of S3 (05 individuals) troop, it was a forest area and no human settlements. In S1 study site abundantly found Kardhai (*Anogeissus pendula*) trees about 11.46% of the total area is covered with Kardhai forest. The composition of the Kardhai forests is the top story and understory are *Anogeissus pendula*, *Mitragynaparvifolia*, *Acacia catechu* etc. In S2 site Bans (*Dendrocalamus strictus*), and Tendu (*Diospyros melanoxylon*) found abundantly. In S3 site mainly found in Babool (*Acacia nilotica*), Ber (*Ziziphus mauritiana*) and Mahua (*Madhuca longifolia*).

**Table 1:** Location of types of langur troops, habitats used with / without human interference by them, predominant trees and availability of their possible predators in Chitrakoot Forest Range

Types of troops & its size	Type of habitat occupied with/without human interference [Altitude(m) Latitude, Longitude]	Dominant tree	Predator presence in the study troop
Bisexual troop S1 (59)	Forest area having crop land nearby (with Temple and human Interference) 190m 80 o 50'59.3 & 25 o 10'24.1"	<i>Anogeissus pendula</i> , <i>Mitragynaparvifolia</i> , <i>Anogeissus pendula</i> , <i>Acacia catechu</i> , <i>Ficus benghalensis</i> , <i>Ficus racemosa</i> , <i>Ficus religiosa</i> , <i>Diospyros melanoxylon</i> , <i>Tamarindus indica</i> , <i>Bauhinia racemosa</i> , <i>Anogeissus latifolia</i> , <i>Pinus roxburghii</i> , <i>Madhuca longifolia</i>	Dhol, Jakal, Dog
Bisexual troop S2 (102)	Forest area having crop land nearby (with temple & human Interference) 206m 80 o 53'0.3" & 25 o 09'24.1"	<i>Dendrocalamus strictus</i> , <i>Acacia catechu</i> , <i>Boswellia serrata</i> , <i>Madhuca longifolia</i> , <i>Mangifera indica</i> , <i>Diospyros melanoxylon</i> , <i>Azadirachta indica</i>	Dhol, Jakal, Dog
Bisexual troop S2 (102)	Forest area having crop land nearby (with no human Interference) 157m 80 o 50'31.7" & 25 o 07'31.7"	<i>Acacia nilotica</i> sp. <i>Indica</i> , <i>Azadirachta indica</i> , <i>Ficus religiosa</i> , <i>Mangifera indica</i> , <i>Aegle marmelos</i> , <i>Ziziphus mauritiana</i> , <i>Ziziphus nummularia</i> , <i>Ficus benghalensis</i> .	Jakal, Dog, Fox

### 3. Result and Discussion

During the study period, the sleeping sites and plant species used for roosting by Hanuman langur (*Semnopithecus entellus*) were recorded. At the evening when sunset, all individuals of each troop would gather around the ground and at the onset of darkness, they would climb the trees for sleeping. All the individuals of studied troop used large tree species, with have numerous branches straight trunk and dense canopy, for roosting. Total 16 tree species, namely, Mahua (*Madhuca longifolia*), Neem (*Azadirachta indica*), Tendu (*Diospyros melanoxylon*), Bargad (*Ficus benghalensis*), Aam (*Mangifera indica*), Safeda (*Eucalyptus globulus*), Khair (*Acacia catechu*), Siris (*Albizia lebbek*), Jamun (*Syzygium cumini*), Salai (*Boswellia serrata*) Imli (*Tamarindus indica*), Kahua (*Terminalia arjuna*), Vilaytibabool (*Prosopis julifolia*) Cheed (*Pinus roxburghii*) Peepal (*Ficus religiosa*) and Umar (*Ficus racemosa*) were used as sleeping trees (Table 2). To study the table it was show that the Hanuman langurs of different focal troop used different plant species for roosting but it was similar to all troop they used tallest plant species for sleeping. Average height of sleeping tree was 17.3m (range 7 -28m). The individuals of a troop usually used one large tree or combination of some high trees and 2-3 small trees close to each other. This combination play

an important role in protection of the troop during attack by predator as the langurs can jump from one branch to another branch and thus protect itself from natural predator. During rainy and cold season the Hanuman langurs sleep in cave and old heritage building and temple. It is possible that variation in microclimate affect choice of sleeping sites in langurs. Strong wind also disturb them. The sleeping trees of Hanuman langurs were well protected from strong wind and that changes in wind direction could influence choice of sleeping site. During summer months, the langur used to sleep on high trees to avoid the excessive heat during the months of May and June. In present investigation it was observed that the Hanuman langur's troop of Kamtanath hills selected the same tree for 5 nights of observation. Many factors influence the selection of sleeping site by Hanuman langurs such as protection from predators, accessibility to food and water sources, physical comfort in terms of shelter from cold wind and rain, avoidance of biting insects, parasite avoidance and human disturbance. In Kamtanath hill (S1) and Hanumandhara (S2) langurs troop during rainy season used tree near temple or in which place where permanent shelter constructed. At the time of crop harvesting, S3 troop living in the vicinity of crop fields, shifted to the trees near the crops fields to raid them for food. When chased by the farmers and their pet dogs, the individuals repeatedly reverted to the roosting sites. During extreme hot weather it was observed that all study troop shifted to the trees around

natural or man-made water sources. It was concluded that the Hanuman langurs usually changed our sleeping site due to the disturbance by the predators and human being.

**Table 2:** Sleeping sites, sleeping trees and their heights for the three focal troops in Chitrakoot forest range

Types of troop	Sleeping site	No. of trees in sleepingsite	Plant Species used as sleepingsites	Approximate height of trees(m)
Kamtanath hills (S1) Troop	A	3	Anogeissuspendula Anogeissuslatifolia Ficusbenghalensis	12 13 15
	B	3	Mitragynaparvifolia, Madhucalongifolia, Ficusreligiosa	12 16 17
	C	2	Ficusracemosa, Tamarindusindica,	13 14
Hanuma--ndhara Troop(S2)	D	3	Mangiferaindica, Azadirachtaindica Diospyrosmelanoxydon,	14 12
	E	3	Boswelliaserrata, Acacia catechu, Acacia niloticasp.Indica	13 11 12
Semariya turn Troop (S3) AMB	F	2	Azadirachtaindica, Ficusbenghalensis,	12 15
	G	2	Mangiferaindica, Ziziphusnummularia	14 10

Ramakrishnan and Coss (2001) also observed that Bonnet macaques and Hanuman langurs preferentially selected sleeping trees close to human settlements to reduce the risk of nighttime attacks from predators that tend to avoid humans but Nilgiri Langurs did not appear to choose sleeping sites close to human settlement. Similar observation found in present study in case of Hanuman langurs.

Chhangani and Mohnot (2006) observed that temporary shifts in sleeping sites of hanuman langurs near to crops fields to raid mature crops in Rajasthan. In present study it was also observed that at the time of crop harvesting, S3 troop living in the vicinity of crop fields, shifted to the trees near the crops fields to raid them for food.

Bishop 1979; Wada & Ichiki 1980; Li et al. 2000; Liu & Zhao 2004; Cui et al. 2006; Liu et al. 2010 reported that in temperate zone primate mostly move to lower altitudes in cold season and during warm season they move higher altitudes. Similar types of observation found in present study during summer months, the langurs used to sleep on high trees to avoid the excessive heat during the months of May and June.

Minhas et al (2010) observed during study period in Machiara National Park all focal troops used 2-11 large and small trees of various species for the roosting within their home range. The langurs of all-male band used 9 roosting sites, of which 5 were used in summer and during winter 4 sites were selected. While in present study there are 15 plant species used by hanuman langurs for roosting. In all-male band used 2 sleeping sites and 4 plant species for roosting.

**Table 3:** Selection of different tree species by Hanuman langurs as sleeping sites in Chitraloot Forest Range

Tree species used as sleeping site	Number of trees used as sleeping site	Per cent selection
Mahua(Madhucalongifolia)	5	5.75
Neem (Azadirachtaindica)	4	5.00
Tendu(Diospyrosmelanoxydon)	4	5.00
Bargad( Ficusbenghalensis),	8	9.20
Aam (Mangiferaindica),	6	6.90
Safeda (Eucalyptus globulus),	2	2.3
Khair (Acacia catechu),	4	5.00
Siris (Albizzialebbeck),	5	5.75
Jamun(Syzygiumcumini)	6	6.90
Salai(Boswelliaserrata)	5	5.75
Imli(Tamarindusindica),	7	8.04
Kahua(Terminaliaarjuna)	8	9.20
Vilaytibabool(Prosopisjulifolia)	4	5.00
Cheed(Pinusroxburghii)	6	6.90
Umat(Ficusracemosa)	5	5.75
Peepal(Ficusreligiosa)	8	9.20

**References**

- [1] Ramakrishnan, U. & R. Coss (2001). Strategies used by bonnet macaques (*Macaca radiata*) to reduce predation risk while sleeping. *Folia Primatology* 42: 193–206.
- [2] Chhangani and Mohnot (2006) also have observed temporary shifts in sleeping sites of hanuman langurs near to crops fields to raid mature crops in Rajasthan.
- [3] Bishop, N. (1979). Himalayan langurs: temperate colobines. *Journal of Human Evolution* 8: 251–281.
- [4] Wada, K. & Y. Ichiki (1980). Seasonal home range use by Japanese monkeys in the Shiga Heights. *Primates* 21:468–83.
- [5] Li, B.G., C. Chen, W.H. Ji & B.P. Ren (2000). Seasonal home range changes of the Sichuan snub-nosed monkey (*Rhinopithecus roxellana*) in the Qinling Mountains of China. *Folia Primatology* 71: 375–386.
- [6] Liu, Z. & Q. Zhao (2004). Sleeping sites of *Rhinopithecus bieti* at Mt. Fuhe, Yunnan. *Primates* 45: 241–248.
- [7] Li, D., C.C. Grueter, B. Ren, Q. Zhou, Z. Peng & F. Wei (2006). Characteristics of night-time sleeping places selected by golden monkeys (*Rhinopithecus bieti*) in the
- [8] Samage forest, Baima snow mountain Nature Reserve, China. *Integrative Zoology* 1: 141–152
- [9] Li, D., B. Ren, C.C. Grueter, B. Li & M. Li (2010). Nocturnal sleeping habits of the Yunnan Snub-Nosed Monkey in Xianguqing, China. *American Journal of Primatology* 72:1092–1099.
- [10] Chopra, G. Bhoombak, M.A. and Kumar P. (2012). Selection and Shifting of Sleeping Sites by Hanuman Langurs in Morni Hills of Haryana, India. *ZOO's PRINT*, Volume XXVII, Number 5, May 2012
- [11] Rajpurohit D.S. 2005. Study the Dominance Hierarchy and its Role in Social Organization in Hanuman

langurs, *Semnopithecus entellus entellus*(D). Ph.D.thesis,  
Jai Narain Vyas University, Jodhpur( Rajasthan) India.

- [12] **IUCN.2003.** IUCN Red List of Threatened Species (EB/OL). <http://www.iucnredlist.org/>.
- [13] **Minhas Riaz Aziz** , **Ahmed Khawaja Basharat** , **Muhammad Siddique Awan**, **Naeem Iftikhar Dar**, **2010.** Habitat utilization and Feeding Biology of Himalayan Grey Langur (*Semnopithecus entellus ajex*) in Machiara National Park, Azad Jammu and Kashmir, Pakistan, *Zoology Research*, Apr.31(2);177-188