

## MORTALITY AND THREATS TO HANUMAN LANGURS (*SEMNOPITHECUS ENTELLUS ENTELLUS*) IN AND AROUND JODHPUR (RAJASTHAN)

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### ABSTRACT

Many factor like habitat destruction due to anthropological reason and climatic condition, electrocution, urbanization, natural predators and Infanticide affects the life span of free ranging langur and leads to artificial death to hanuman Langur. In our study out of total observed death (7.8% of total langur population) of langur, 35.7 % was due to only electrocutions and 23.6% due to road accident, 16% due to Natural predator, 22.2% due to unknown cause and 2.5% due to infanticide). The results suggest that electrocution is a major cause of death of free ranging langur.

**Key words:** Hanuman langurs, Mortality, Electrocutions, Natural Death, Habitat destruction.

### Introduction

The Hanuman langur, *Semnopithecus entellus* (Dufresne, 1797), is the most widely distributed of 19 non-human primate species found in the Indian subcontinent (Roonwal and Mohnot, 1977; Wolfheim, 1983). Social units in common langurs include one-male bisexual troops, multi-male bisexual troops and all-male bands. In the western parts of their habitat in India (i.e. Jodhpur), langurs usually form unimale bisexual troops (Mohnot, 1974). Bisexual troops are generally matrilineal, with females remaining for life in their natal troops and with males emigrating, usually as juveniles, to join unisexual units (i.e. all-male bands). Resident males of troops are usually replaced after 2-3 years of tenureship, ranging from 3-60 months. (Mohnot *et al.*, 1987; Rajpurohit, 1987; Sommer and Rajpurohit, 1989; Rajpurohit and Sommer, 1993). The langurs feed on about 190 wild and cultivated plant species. (Mohnot, 1974; Srivastava, 1989; Winkler, 1981.) Due to their great behavioural flexibility and learning capacities, Hanuman langurs are able to adapt to varying environmental conditions (Mohnot, 1974; Winkler, 1981; Rajpurohit, 1987; Sharma, 2007). Jodhpur langurs have been living in the areas of the Parks, Temples, and roof-tops of houses since last 40 years. Many highways roads, high voltage electricity lines and railway tracks are passing from near sides of roosting sites or from their homerrage areas. Ferals dogs are also finding near to their feeding area.

### Material and Methods

#### Study area and study animal

The study was conducted in and around Jodhpur,

India. The Jodhpur city (altitude 241m, 26° 18' N and 73° 08' E) is situated on the eastern edge of the Great Indian Desert. In its vicinity, a 26 km long diagonal ridge runs from the village Arna in the west to Daijar in the northeast passing through the Jodhpur fort. This ridge forms a plateau with an area of about 150 km<sup>2</sup> reaching a maximum breath of 5-6 km. The arena is covered with open scrub dominated by *Euphorbia caducifolia* and *Anagysus pendula* in the rocky and *Prosopis juliflora*, *P. cineraria*, *Acacia senegal* and *Ziziphus numilaria* on the plains. There are numerous irrigated fields and parks in the area.

The langurs are easy to observe since they are not shy and spend most of the day time on the ground (Mohnot, 1974; Roonwal and Mohnot, 1977; Rajpurohit, 1987). The climate of Jodhpur is characterized by uncertain and variable rains, with an annual mean precipitation of 390 mm restated to the monsoon months of July to September, a hot dry summer with max temperature reaching 48° C and a cold dry winter with the min falling below 5° C.

### Methods

Data were collected during a long-term study entitled eco-behavioural diversity of Hanuman langur (*Semnopithecus entellus*) living in different ecosystems in and around Jodhpur. There is close watch to individuals of focal troops where data of dead langur and cause of death was recorded. Beside this is also watch closely on the infrastructure near side to roosting and foraging sites of langurs. Occasionally road kills were also reported by local feeders and tourist. These information were included in this study after verification and confirmation.

The mortality of Hunuman langur due to road accident is because of their diurnal habitates.

### Observation and Result

Data presented in this paper were collected from 20 groups and bands which includes 16 (80 %) bisexual troops and 4 (20 %) all male bands. The species and location of each road accident resulting into death of wild taxa were recorded while driving on the highway to and from the study area. Occasionally road kills were also reported by local feeders and tourist. These information were included in this study after verification and confirmation. The recording efforts remained more or less constant throughout the study. Road kills generally disappeared from the road within few hours to a day as a result of scavengers operating in the area.

Following are threats to were observed in this investigation:

(A) Habitat destruction : From last 20 years there is spurt increase in human population that brings extra demands for lands, food, and other resources that ultimately result in the degradation or destruction of habitats of langurs are of the serious concern. Jodhpur is hilly area and mining is an alternate option for people for earning. Due to increase in human population mining work going on progress due to that in the roosting site which present in hill cliffs suffer from adverse disturbance.

Some places it is observed that people destroyed their roosting sites from their fields and also from human habitats. Somewhat climatic conditions like big storm and heavy rainfall are also responsible for the habitat destruction

(B) Electrocutation : At Jodhpur site from April 2009 to May 2011 total 53 dead langurs observed in various troops in and around Jodhpur and when average total population of langurs were recorded more than 2000 (Rajpurohit *et al.*, 2010) then total death 7.8% observed in study troop. Out of total death 35.70 % was due to electrocutation. Most of deaths due to electrocution observed at Kailana Lake (B-19) where 8 langurs are die due to electrocution on same electrical pole. One side of this area road track and parallel to this high voltage electricity line passes. Death due to electrocution is observed in the groups (AMB and Bisexual troop) mentioned in Table 1.

(C) Death due to infanticide : Only four (i.e. 2.5%) case of infanticide were observed during this study period. All cases were observed after sudden resident male replacement.

(D) Killed by natural predators : There are only feral dogs present as the natural, predators. 16% out of total death of langurs killed by these predators were observed

Table 1 : Mortality cases in langur population in and around Jodhpur during May-2009 to April-2011

S.No.	Troop/AMB	Location	Cause of Death					Total
			Electrocution	Road Accident	Natural Predator	Unknown	Infanticide	
1.	AMB-1	Daijar FCI Godown	6	5	-	2	-	13
2.	B-1	Daihar Temple	9	1	2+1**	4	1	18
3.	B-3	Beriganga	1	-	1	2	-	4
4.	AMB-2	Beriganga	1	-	1	-	-	2
5.	B-4a	GSK Nimba	2	1	-	-	-	3
6.	B-6	Mandore Devel	2	-	-	2	1	5
7.	B-7a	Mandore	1	-	3	2	1	7
8.	B-7	Mandore Fort	4	-	2	2	-	8
9.	B-8	Mandore Temple	-	-	3	1	-	4
10.	B-9	Mandore NS	3	2	2	1	-	8
11.	AMB-4	Mandore South	2	2	-	-	-	4
12.	B-11	Kaga North	1	-	3	-	-	3
13.	B-12	Kaga South	1	-	2	-	-	4
14.	B-17a	Soorsagar Bg	2	2	-	1	-	5
15.	B-18	Kaiana Canal*	3	5	1	-	-	10
16.	B-19	Kailana I	8	2	-	5	-	14
17.	AMB-13	Barli	3	4	-	-	-	7
18.	B-20	Bijolai	-	2	-	5	-	7
19.	B-21	Kailana-II	3	2	2	5	-	12
20.	B-26	Kadamkandi E	2	4	1	1	-	8
21.	B-27	Kadamkandi W	-	4	-	1	-	5
22.	B-29	Arna	2	1	1	1	1	6
23.		Total	56	37	25	33	4	154

\*\* Male monkey killed by alpha male of bisexual troop

informed in different study site.

(E) Road Accidents : It was observed that at roosting sites specially on Kailana canal, Kadamkandi, Barli troops and GSK troops are near the highway and they came on road during feeding. When any vehicle passes from the road langurs move in large number together to avoid disturbance goes for accidental death. 22.2% Langur die due to road accident.

Vehicles and trains often kill wild animals, even in the protected areas, wildlife sanctuaries and national parks. In the present study at Jodhpur and surrounding area a total 278 road-kills of wild species recorded. Which includes mammals, birds, reptiles and others of which 33 cases of road accident were recorded in 20 bisexual troops and all male bands of Hanuman langur. These cases of road accidents 20 male and 13 female were killed, which suggests that males died significantly more than females in road accidents.

#### Discussion

The relationship between human and non-human primates in Asia is more complex and intimate than anywhere in the world (Roonwal and Mohnot, 1977). This study on quantitative mortality of Hanuman langurs around Jodhpur presents recent data on the studies here.

Many highways roads and railway tracks are passing from Jodhpur and surrounding area. Collision of wild animals with vehicles and trains are common in India. Death of bluebills (*Boselaphus tragocamelus*), chinkara (*Gazella gazella*), black bucks (*Antelope cervicapra*), Hanuman langurs (*Semnopithecus entellus*),

jackals (*Canis aureus*), and jungle cats (*Felis chaus*) can be observed occasionally. The range of species affected by vehicular traffic and road kills have not been quantified in India except for few studies carried out elsewhere (Broekhuysen, 1965; Lewis, 1989; Lopez and Roviralta, 1993; Lopez, 1993; Drews, 1991, 1995). Killing of Hanuman langurs in road accidents have been observed in other studies by Mohnot (1974); Rajpurohit (1987); Agoramoorthy (1987); Rajpurohit and Chhangani (1997); Chhangani (2000) and (Rajpurohit and Chena, 2011). The mortality of Hanuman langurs due to road accidents is because of their diurnal habits. These non-humans primates keep close to temples. They offer food to langurs seen around. The latter have developed habit of keeping them close to temple (Devilal, 2009). Provisioning of langurs along the roads by people is very common due to religious sentiments and langurs also expect food from every vehicle and do not bother much to speedy vehicles passing through. These vehicles often hit langurs and kill or injure them. Many times during fights and interactions between bisexual troops and all-male bands, animals suddenly and unknowingly come in front of the vehicles while running behind and chasing at a speed of 60-70 km/hr and are thus hit the vehicles. In such cases langurs often die instantaneously. Langurs also utilize roads for walking, juvenile playing running and foraging on vegetation available along the roadside. This is also an added advantage to langurs to avoid predators. The causes of deaths of langurs at Jodhpur are predation, road accident; diseases, electrocutions, etc. were recorded.

#### Acknowledgement

The authors are grateful to S. M. Mohnot, Emeritus Professor of Zoology and chairman, Primate Research Center, Jodhpur, for continuous encouragement; to Prof. Devendra Mohan and Prof. Ashok Purohit Head, Department of Zoology, J.N.V. University, Jodhpur for the logistic support. The fieldwork is a part of research activity conducted under a programme ecobehaviour studies on Hanuman langurs around Jodhpur (2009- 2011). Thanks are due to UGC, New Delhi for financial support under major project. Thanks are also due to office staff of the project for typing the MS.

**जोधपुर ( राजस्थान ) में और इसके चारों ओर हनुमान लंगूरों ( सीमनोपिथीकस इन्टीलस इन्टीलस ) के लिए संकट एवं मर्त्यता**

चीना राम, गौतम शर्मा एवं एल.एस. राजपुरोहित

#### सारांश

मानवविज्ञानीय कारण एवं जलवायवीय अवस्थाओं, विद्युतमारण, शहरीकरण, प्राणिक परभक्षियों एवं शिशुहत्या के कारण आवास विनाश जैसे अनेकों कारक मुक्त विचरण करने वाले लंगूर के जीवनकाल को प्रभावित करते हैं तथा जिसके फलस्वरूप हनुमान लंगूर की निम्नमौत होती है। हमारे अध्ययन में लंगूर की कुल प्रेक्षित मौत ( कुल लंगूर आबादी का 7.8% ) में से केवल विद्युतमारण के कारण 35.7% थी और सड़क दुर्घटना के कारण 23.6%, प्राणिक परभक्षी के कारण 16%, अज्ञात कारणों के कारण 22.2% तथा शिशुहत्या के कारण 2.5% थी। परिणाम दर्शाते हैं कि विद्युतमारण मुक्त विचरण करने वाले लंगूरों की मौत का प्रमुख कारण है।

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