Population Status of Phayre's Langur Trachypithecus phayrei in Sepahijala Wildlife Sanctuary, Tripura, Northeast India

Authors: Adimallaiah, Doki, Thiyagesan, K., and Gupta, A. K.

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Population Status of Phayre's Langur *Trachypithecus phayrei* in Sepahijala Wildlife Sanctuary, Tripura, Northeast India

Doki Adimallaiah[1], K. Thiyagesan[2] and A. K. Gupta[3]

[1]*Wildlife Crime Control Bureau (WCCB), Western Region, Ministry of Environment, Forests & Climate Change, Navi Mumbai, India*
[2]*Department of Zoology and Wildlife Biology, A.V.C College (Autonomous), Mayiladuthurai, TamilNadu, South India*
[3]*Addl. Principal Chief Conservator of Forests, Government of Tripura, Agartala, Tripura, Northeast India*

Abstract: We studied the population status of Phayre's langur (*Trachypithecus phayrei*) in the Sepahijala Wildlife Sanctuary (23°37'N to 23°42'N and 91°17'E to 91°21'E), West Tripura district, Northeast India, from December 2009 to February 2010. Using line transect and recce sampling, we recorded seven groups comprising 95 individuals. The average group size was estimated at 13.14 individuals per group (range 8–19, SD = 3.77). The population comprises 7.4% adult males, 34.7% adult females, 23.2% of sub adults, 26.3% juveniles, and 8.4% infants.

Key Words: Phayre's langur, population status, Sepahijala Wildlife Sanctuary, threats, Tripura.

Introduction

Phayre's langur, *Trachypithecus phayrei* (Blyth, 1847), is found in Bangladesh, Myanmar, China, India, Thailand, and Vietnam (Roonwal and Mohnot 1977; Stanford 1988; Gupta and Kumar 1994; Srivastava 1999; Bose 2003; Min *et al.* 2005). In India, the nominate subspecies is found only in the lower northeastern states bordering Bangladesh (Menon 2003); Tripura, Mizoram, and Assam, from sea level to 800 m (Mukherjee 1982; Choudhury 1987, 1994a, 1994b; Srivastava 1999; Bose 2003; Aziz and Feeroz 2009). It inhabits subtropical evergreen, broadleaf, deciduous, and bamboo forests and semi-evergreen forests (Srivastava and Mohnot 2001; Molur *et al.* 2003; Walker and Molur 2007). Phayre's langur is found in higher densities in mixed-species plantations than in monoculture plantations (Gupta 1997). In Tripura, Phayre's langurs are reported from all over the state, but more in the southern districts than in the western and northern districts (Mukherjee 1982; Gupta 1997). The healthiest population is found in the Trishna Wildlife sanctuary (Gupta 2001). The species has been studied by Mukherjee (1982), Gupta and Kumar (1994) and Gupta (1997, 2001). Gupta (2001) recorded 81 plant species in the diet of a Phayre's langur group in the Sepahijala Wildlife Sanctuary. He listed the major food plants and described the group composition and the breeding season. There have been no studies carried out on Phayre's langur in the Sepahijala Wildlife Sanctuary since 1993. In this paper, we report on the population status and threats to Phayre's langur in the Sepahijala Wildlife Sanctuary.

Study Area

The Sepahijala Wildlife Sanctuary (1,853 ha) is situated in the western part of Tripura, in the Bishalgarh Civil Subdivision of West Tripura district, about 20 km from the capital Agartala (Fig. 1). It lies between 23°37'N and 23°42'N and 91°17'E and 91°21'E, altitude 50 m above sea level. It was created in 1987 with an area of 18.53 km² but, in 2008, 5.08 km² of the Sepahijala Wildlife Sanctuary was declared a Clouded Leopard Sanctuary to protect the endangered clouded leopard (*Neofelis nebulosa*) (Chakraborty 2004–2005). Sepahijala Zoological Park was established in the buffer zone of the Sepahijala Wildlife Sanctuary with the approval of Central Zoo Authority (CZA). The terrain is undulating, with small hillocks. Summer temperatures vary from 20.5°C to 36.2°C, and winter temperatures from 7°C to 27.1°C. Annual rainfall is about 234 cm.

The forest is classified as Moist Mixed Deciduous, with Secondary Moist Bamboo Brakes. There are also man-made forests of sal (*Shorea robusta*), teak (*Tectona grandis*), patches of acacia or wattle (*Acacia auriculiformis*) and rubber (*Hevea*). The five primates found in Sepahijala Wildlife Sanctuary are Phayre's langur (*Trachypithecus phayrei*), capped langur (*Trachypithecus pileatus*), pig-tailed macaque (*Macaca nemestrina*), Rhesus macaque (*Macaca mulatta*) and the Bengal slow loris (*Nycticebus bengalensis*).

Habitat degradation caused by eco-tourism and the communities living in and around the sanctuary are the main threats to the sanctuary's integrity. Tourism is associated with

rubbish (plastics). Teasing the monkeys and playing loud music inside the sanctuary is also an issue. There is a road inside the sanctuary used for tourism, resulting in occasional road kill.

Methods

Population studies

A preliminary survey was carried out to record the habitat types and habitat quality, and to become familiar with the trails that would be used for the survey. Previous census data of the Phayre's langur was obtained from the forest department, and local people were questioned about how many Phayre's langur groups they believed occurred in the sanctuary.

From December 2009 to February 2010, we carried out surveys using line transect and recce sampling on all trails in the sanctuary (Swapna *et al.* 2008). Transects were walked from 05:30 to 12:00 and from 14:00 to 18:00 or sunset. On each survey we stopped every 200 m to look and listen for monkeys. When a group was seen, we recorded its size and age-sex composition. Only total group counts were used to estimate the group size (Srivastava, *et al.* 2001a, 2001b; Fashing 2002; Pruetz and Leasor 2002; Srivastava 2006; Medhi *et al.* 2007). We recorded the time they were seen, GPS location, duration of observation, and the tree species they were in or feeding on. Each trail was surveyed three times.

Individuals were classified as adult male (AM), adult female (AF), subadult (SA), juvenile (J) or infant (I) based on the morphological characters and differences described by Bhattacharya and Chakraborthy (1990), Choudhury (1987), Srivastava (1999) and Gupta (2001). Some subadults could not be sexed due to the dense vegetation and poor visibility.

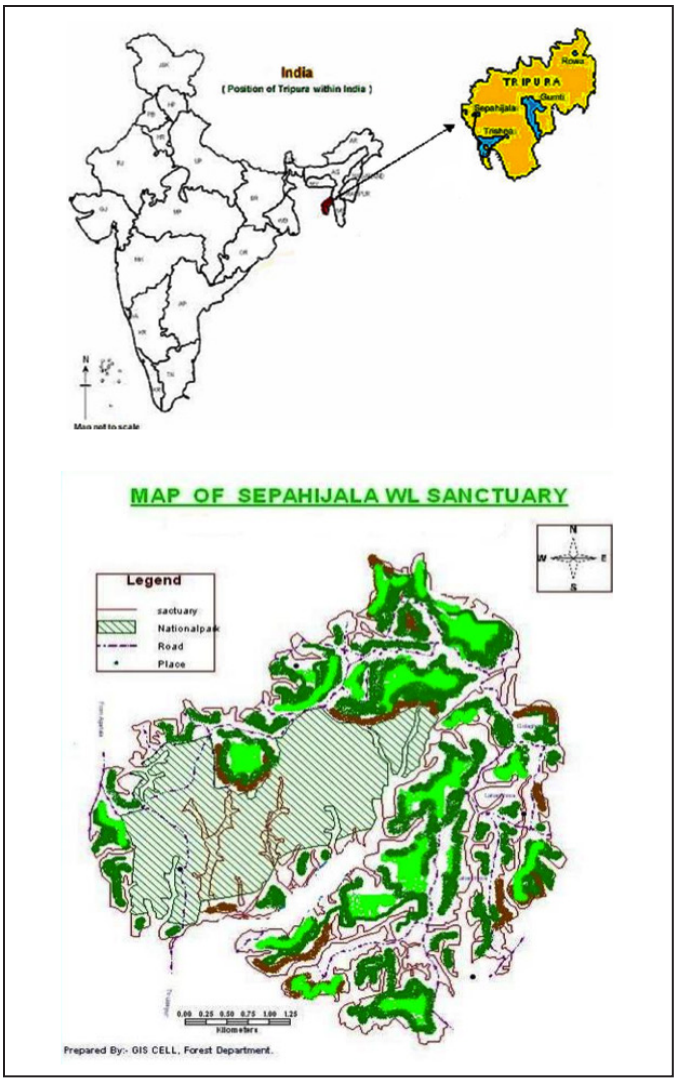

Figure 1. The Sepahijala Wildlife Sanctuary, Tripura, India.

Table 1. Survey trails and their vegetation types in the Sepahijala Wildlife Sanctuary, West Tripura.

	Length (km)	Habitat
1	1.4	Agricultural land one side, the other side a young sal plantation, young sal plantation, mature sal plantation with bamboo brake, mixed bamboo patch, *Cassia* plantation
2	2.1	Open area, agricultural land and nurseries, open area with scrubby vegetation and scattered trees, human habitation, mature sal mixed forest, mature sal mixed forest with bamboo brakes, mixed bamboo mature forest – closed canopy, mature mixed forest, closed canopy, secondary mixed forest and rubber plantation
3	1.95	Secondary teak mixed forest, secondary teak mixed forest, secondary forest, mature mixed forest, mature mixed forest – closed canopy, rubber plantation
4	3.6	Sal mixed forest in a small *Acacia* plantation, sal mixed forest, teak mixed forest, open area – agricultural lands, open area – human habitation, bamboo dominated secondary mixed forest, secondary mixed forest, dense secondary mixed forest, bamboo-dominated secondary dense mixed forest
5	3.35	Mature sal forest, open area – agricultural land, secondary mixed forest, 10-ha agar plantation – agar mixed patch, open area – human habitation, secondary mixed forest, secondary bamboo dominated mixed forest (bamboo planted), dense mature mixed forest patch (small patch is close to the zoo, probably why it is less disturbed)
6	3.25	Dense mature mixed forest patch (small patch close to the zoo probably why it is less disturbed), secondary mixed forest, secondary mixed dense forest, open area – agricultural lands, secondary teak mixed forest (open), secondary teak mixed forest (open) with bamboo plantation nearby, open area – grass plantation area, bamboo dominated secondary mixed open forest and secondary sal mixed forest
7	3.7	Mixed partially dense forest with patches of acacia, mixed partially dense forest with teak plantation, open shrub jungle, open mixed forests with bamboo brakes, mixed forest with bamboo and open in nature, open area with pond surrounded by a mixed dense forest, open mixed forest shrubby, sal mixed forest with partially dense canopy cover, sal mixed forest with dense canopy cover, sal mixed forest open canopy, mixed forest with bamboo, secondary mixed forest open area, mixed forest young plants water body, mixed forest partially dense slope followed by open area, shrub jungle with teak
8	2.0	Open shrub, dense scrub forest, dense shrub jungle with occasional sal trees, open shrub with bamboo clumps, and bamboo plantation.

In adults, sex was determined by the sex organs and by the pale yellow patch that surrounds the eyes. It is circular or elliptical in the males, and triangular or cone shaped in the females (Choudhury 1987; Gupta 2001). The pale patch is not prominent in juveniles and infants. The juveniles were identified based on their closer contact with their mothers when they rest and roost. The infants were identified by their orange color that begins to change to adult coloration at about three months of age (Srivastava 1999). Groups were monitored to record changes in size. Births typically occur from November to February (Gupta 2001).

Forest disturbance

We recorded evidence of human activities in a 10-m radius at points every 200 m along the trails. Disturbance included wood cutting, grazing, logging, cultivation, houses, bamboo collection (illegal), firewood collection, forest fires, and trampling. The presence of dung indicated grazing pressure. The various forest types along each transect were also recorded (Table 1).

Results

Preliminary survey

The habitat types found in the sanctuary include moist mixed deciduous forest, sal (*Shorea robusta*) forest, sal (*Shorea robusta*) mixed forest, teak (*Tectona grandis*) mixed forest, secondary bamboo brakes, and bamboo plantations. The previous census data of Phayre's langur recorded four groups, comprising 46 individuals (Tripura Forest Department). Reports from local people indicated that the population was made up of just three troops.

Population

An estimated seven groups, comprising 95 individuals, were recorded during the study period (Table 2). They were identifiable by their size and composition. Groups four and seven were the same size (12 individuals), but differentiated by the broken tail of the adult male in group 7. The smallest group had eight individuals and the largest group 19. The average group size was 13.14 individuals (range 8–19, SD = 3.77). Percentage group composition was 7.4% adult males, 34.7% adult females, 23.2% of subadults, 26.3% juveniles and 8.4% of infants. The groups were found to have one male and from three to seven females; a uni-male, multi-female social system. Eight births were recorded during the months of January and February. A single infant was present in each group except for one, which had two infants.

Threats

Human disturbance in the forest included logging, grazing, cultivation, firewood collection, fires, illegal bamboo collection, trash (plastics), and tourists agitating and teasing the monkeys and other wild animals. The percentage recorded occurrence was as follows: grazing 20%, cutting of trees for timber 20%, cultivation 16%, human habitation 7%, illegal bamboo collection 2%, forest fires 2% and other illegal activities such as firewood collection 24% (Fig. 2). Grazing and firewood collection are the most frequent disturbances in the sanctuary. Timber collection was prominent on three of the trails. Transect number three that traversed the rubber plantation and passed through the mixed deciduous forest was the least disturbed, and five of the seven groups of the Phayre's langur groups were seen there. Since the Sepahijala Zoological Park is located by the wildlife sanctuary, a road connecting the zoological park with the highway that is used by tourists is also a threat to the Sepahijal Wildlife Sanctuary. During the study period we reported two road kills; a porcupine and a macaque.

Discussion

The population of Phayre's langur in the Sepahijala Wildlife Sanctuary was estimated at seven troops comprising 95 individuals (eight of them infants). This is higher than that of

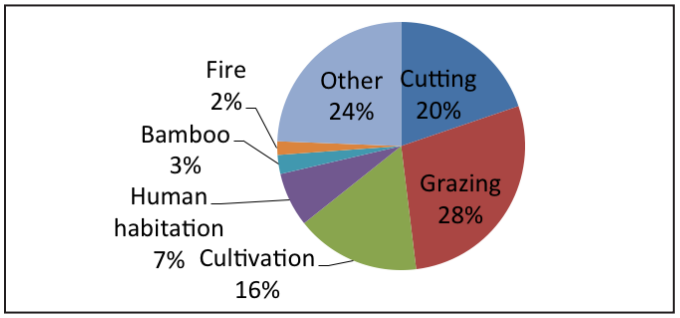

Figure 2. Disturbances recorded in the Sepahijala Wildlife Sanctuary

Table 2. Size and composition of the Phayre's langur (*Trachypithecus phayrei* phayrei) groups recorded in the Sepahijala Wildlife Sanctuary.

Group	Coordinates		Adult male	Adult female	Subadult	Juvenile	Infant	Total
1	23°39'57.9"N	91°18'29.6"E	1	6	5	5	1	18
2	23°39'58.4"N	91°18'28.8"E	1	4	4	3	1	13
3	23°39'58.7"N	91°18'24.8"E	1	5	2	4	1	13
4	23°39'59.6"N	91°18'23.9"E	1	4	3	3	1	12
5	23°40'00.3"N	91°18'22.6"E	1	3	1	2	1	8
6	23°40'01.9"N	91°18'22.0"E	1	7	4	5	2	19
7	23°39'48.2"N	91°18'19.6"E	1	4	3	3	1	12
Total								95

the forest department census report (2009), which recorded 45 individuals in four groups. In 1993, however, Gupta estimated the Phayre's langur population in the Sepahijala Wildlife Sanctuary to be 17 groups, with group sizes ranging from 8 to 22 individuals. The reasons for the decline of the population are unclear. No poaching or deaths were recorded during the study period. The decline might be due to inbreeding or disease, which need to be investigated in future long-term studies. Disturbance from logging, firewood collection, bamboo collection, road kill (accidents by vehicles) and other anthropogenic pressures may also be indirect causes for the population decline. The Sepahijala Wildlife Sanctuary is a small but important protected area for Phayre's langur, and ecological studies and long-term monitoring of the population are needed.

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Doki Adimallaiah, Wildlife Crime Control Bureau, Western Region, Ministry of Environment, Forests & Climate Change, CBD Belapur, Navi Mumbai-400614, India, **K. Thiyagesan**, Department of Zoology and Wildlife Biology, A.V.C College (Autonomous), Mannampandal, Mayiladuthurai, TamilNadu, South India, and **A. K. Gupta**, Addl. Principal Chief Conservator of Forests, Government of Tripura, Agartala, Tripura, Northeast India. E-mail of first author: <aaditya.wildlifebiology@gmail.com>.

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