OCCURRENCE RECORDS OF THE BENGAL SLOW LORIS (*Nycticebus bengalensis*) IN NORTHEASTERN INDIA

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ABSTRACT

The Bengal slow loris, *Nycticebus bengalensis* is a cryptic nocturnal primate whose distribution within India is known only from incidental records and few targeted surveys. We report three opportunistics sightings of the species made along nocturnal walks as well as two captive lorises in three states in northeastern India - Meghalaya, Assam and Arunachal Pradesh. We also provide photographic documentation of lorises from two of the states to document differences in pelage coloration. Slow lorises are under threat due to deforestation, hunting and the pet trade, but more information regarding their occurrence and ecology is needed to improve conservation efforts.

Keywords: Bengal slow loris, *Nycticebus bengalensis*, occurrence, northeastern India.

INTRODUCTION

The Bengal slow loris (*Nycticebus bengalensis*) is one of seven nocturnal strepsirrhine primates that occur in Asia (IUCN, 2008). The genus *Nycticebus* (Family Lorisidae) is distributed from northeastern India eastward through South and Southeast Asia into the Philippine islands, and *N. bengalensis* is a wide-ranging species that occurs in northeastern India, Bangladesh, Myanmar, Cambodia, southern China, Lao People's Democratic Republic, northern Thailand, and Vietnam (IUCN, 2008). This is the only nocturnal primate in the northeastern Indian states, and is listed in Schedule I of the Indian Wildlife (Protection) Act, 1972. Little is known about the ecology of the species across its range and it is categorized as Vulnerable in the IUCN Red List (IUCN, 2008). *N. bengalensis* is reported to occur in evergreen and semi-evergreen forests and is recorded from all seven states of Northeast India (Choudhury, 2001). However, Choudhury (2001) does not state the origin of these records, and or whether they are based on direct sightings or accounts by local residents. Targeted surveys have been conducted only in Meghalaya, Assam (Radhakrishna *et al*. 2006) and some parts of Tripura (Swapna *et al.,* 2008). Mishra *et al.* (2006) reported the presence of slow lorises in Arunachal Pradesh based on secondary information.

In this paper, we collate direct sighting records as well as other occurrence information on the Bengal slow loris, which were obtained during field studies for other projects. The records are from Assam, Meghalaya and Arunachal Pradesh and are the most recent records of direct sightings of the Bengal slow loris from these locations. The Bengal slow loris is reported to vary in color across its range (Sindhu Radhakrishna, pers. comm.), and in order to documentation this variation, we present photographs of three individuals.

METHODS

We compiled reports of lorises gleaned from incidental records in the field during nocturnal walks as well as from interactions with the local community. Fieldwork was conducted in different states in Northeast India by the three authors on separate research projects aimed at small carnivores, flying squirrels and small mammals. Trails were walked by one or more investigators and two or more field assistants shortly after dusk. Spotlights and flashlights (white light) were used to locate nocturnal mammals. Most effort was focused on the arboreal community, and different levels of the canopy were searched for eyeshine. Once an eyeshine was detected, more light and binoculars were used to identify the animal. This method has been used in various studies focusing on nocturnal, arboreal mammals (Duckworth, 1998; Rajamani, 2000). Lorises were detected this way in Assam, Meghalaya and Arunachal Pradesh.

Additionally, occurrences of lorises in Assam and Meghalaya were also documented from the local forest department offices as well as resident communities.

RESULTS

We sighted three slow lorises in the wild in Assam, Meghalaya and Arunachal Pradesh and observed two captive slow lorises (Table 1 & 2, Figure 1). Given the paucity of information on occurrences of slow lorises from the wild in India, it is important to provide detail about the sighting locations and to list the existing threats present at these individual sites.

1. Direct Sightings of Slow Lorises in the Wild from Nocturnal Walks

A. Assam

On 25th May 2007, at 18:45 h, KK and her field team detected a slow loris in the Jeypore Reserve Forest (RF) (108 km^2) at N 27.20147°, E 95.44476° (altitude ca. 150 m above sea level [asl]), 900 m west of the Kothalguri Beat Office along the Jeypore-Khonsa road. KK's field assistant Lakhindra Sonowal spotted the animal by its red eyeshine behind a large fork on a free-standing *Ficus* tree (tree not in fruit). The forest here is categorized as Assam valley tropical wet evergreen forest (category 1B/C1) (Champion & Seth, 1968), also called the Upper Assam *Dipterocarpus - Mesua* forest. It was heavily logged in the past, but now relatively undisturbed. However, there is moderate traffic on the Jeypore-Khonsa road, and occasional incidents of poaching for meat are reported by local people. The Assamese name for the slow loris is *Lajuki Bandor*.

B. Meghalaya

A Bengal slow loris was sighted (by all authors) on 12th March 2007 in Baghmara RF (43.92 km^2) after 3 hours of walk between Panda and Ampangre on the Baghmara-Maheshkola road (N 25.20121°, E 90.69569°, altitude ca. 150 m asl). The authors were walking down the road at a speed of 1 km/hour, and the animal was sighted in the forest interior approximately 20 m from the edge of the road. As soon as we spotted the animal it froze, but then subsequently moved into the foliage and onto a neighboring tree. The habitat is a tropical semi-evergreen forest and at that time, trees were devoid of mature leaves and new leaf flush and flowers were begining to appear. Figure 2 is a photograph of the loris sighted here. The slow loris is known in Meghalaya as *Gilwe*.

C. Arunachal Pradesh

On 20th November 2007, at 19:57 h, a slow loris (Figure 3) was sighted by Kalyan Varma and three other naturalists in Deban, Namdapha Tiger Reserve, in the forest off the Miao-Vijaynagar road (N 96.391207°, E 27.497210°, 339 m asl). The loris was sighted on a tree that bent over the trail (ca. 2 m from the road). The four naturalists searched the vegetation using flashlights and walked through the forest with a speed of ca. 1.5 km/hour. The forest type is low elevation tropical evergreen forest. Local

Table 1. Locations of occurrence of the Bengal slow loris (*Nycticebus bengalensis*) in Assam, Meghalaya and Arunachal Pradesh.

Record No.	State	Site	GPS Location	Altitude m amsl	Habitat type	Date
1	Assam	Jeypore Reserve Forest, Dibrugarh Division	N 27.20147°, E 95.44476°	150	Assam Valley Tropical Wet Evergreen	25 May 2007
2	Assam	Namtok, Dirok part of the Dehing-Patkai WLS, Digboi Division	N 27.26174°, E 95.60981°	100	Assam Valley Tropical Wet Evergreen	31 December 2005
3	Meghalaya	Baghmara Reserve Forest, Garo Hills Division	N 25.20121°, E 90.69569°	150	Tropical Semi-evergreen	12 March 2007
4	Meghalaya	Gongrot Aking, adjoining Balpakram NP, Garo Hills Division	N 25.263050°, E 90.730530°		*Jhum* field bordering Tropical semi-evergreen forest	April 2005
5	Arunachal Pradesh	Deban, Namdapha Tiger Reserve	N 27.497210°, E 96.391207°	339	Low Elevation Tropical Evergreen	20 November 2007

Table 2. Details of direct sightings of wild Bengal slow lorises.

Record No.	Location	Height of animal on tree (m)	Height of tree (m)	Time of sightin (hours)	Duration of walk (hours)
1	Jeypore Reserve Forest, Dibrugarh Division, Assam	7	15	18:45	2.0
3	Baghmara Reserve Forest, Garo Hills Division, Meghalaya	13	20	19:30	3.5
5	Deban, Namdapha Tiger Reserve, Arunachal Pradesh	20	approx. 25+	19:57	1.5

communities are reported to hunt wildlife, and the forest along the Miao-Vijaynagar road is disturbed by regular movement as well as extraction of timber and other resources by local tribal communities (Datta, 2006).

2. Captive Lorises

We observed two captive lorises, one in Assam and one in Meghalaya. In both cases the animals were released into the nearby forest patches.

A. Assam

A male slow loris caught by a tea estate worker from Namtok, Dirok Forest, part of the Dehing Patkai Wildlife Sanctuary (WLS), was rescued on the 31st December 2005 and handed over to Mr. Pradipta Barua, Range Forest Officer,

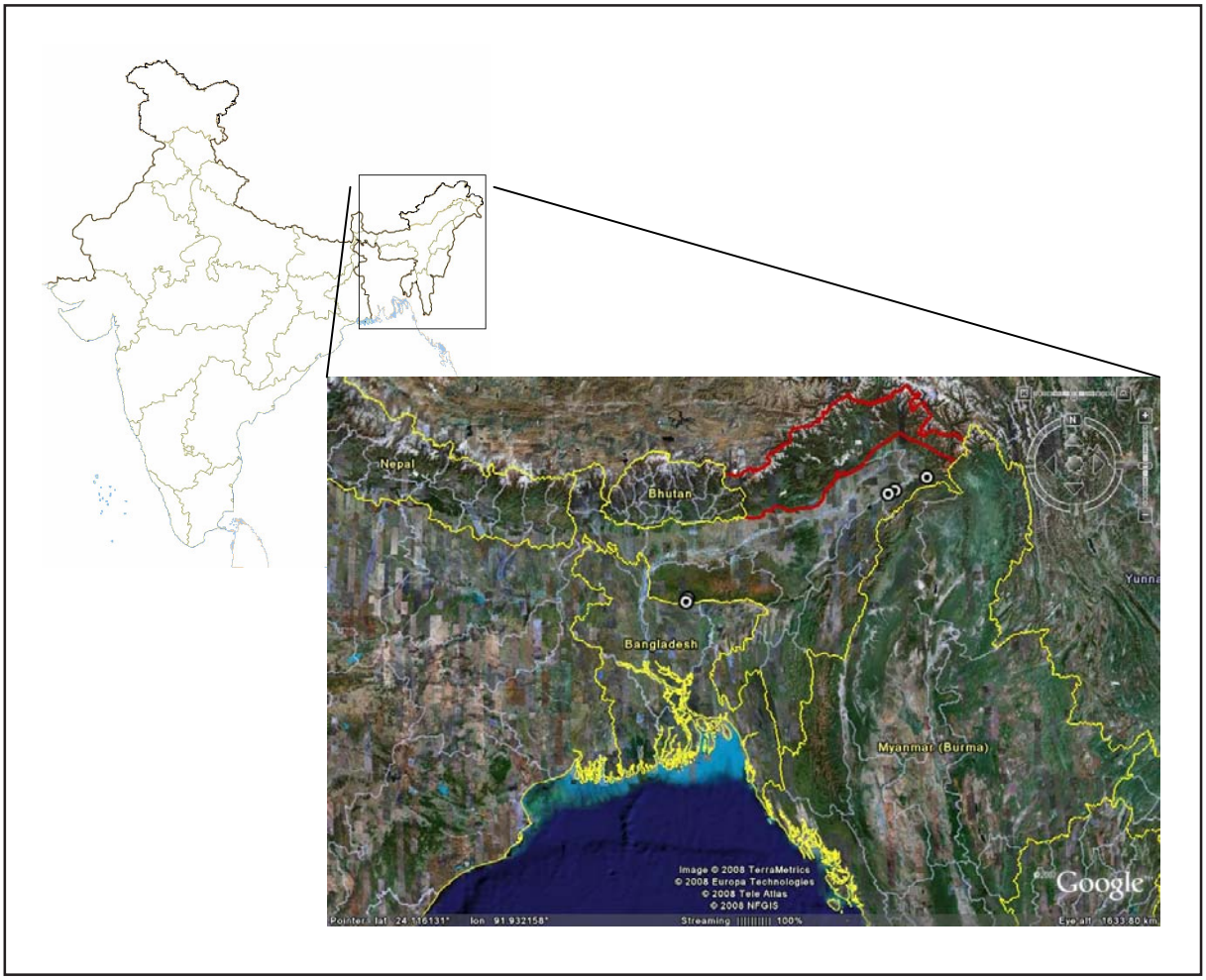

Figure 1. Map of India with focus on the Northeast. Sightings of the Bengal slow loris are plotted on the map.

Figure 2. Bengal slow loris sighted at Balpakram Reserve Forest, Meghalaya.

Figure 3. Bengal slow loris sighted at Deban, Namdapha Tiger Reserve.

Margherita West Range, Digboi Forest Division, Assam. The animal was released the next day into Dirok Forest (Beat Office location N 27.26174°, E 95.60981°, 100 m asl, 30 km²). The forest here is Assam valley tropical wet evergreen forest, previously logged and now with secondary vegetation as well as extensive tall *Dipterocarpus macrocarpus* (Hollong) plantations. Poaching is suspected to occur at this site also.

B. Meghalaya

A slow loris (Figure 4) was captured from a *jhum* field adjoining Balpakram National Park and kept in Gongrot *Aking* (unit of clan land consisting of one or more hamlets) (N 90.730530°, E 25.263050°), Rongra Block, south Garo Hills district, Meghalaya, between March and April 2005. The loris was kept as a pet in a small bamboo cage for 2-3 weeks in a household within the *Aking* (ca. 50 households). The family initially fed the animal with rice, but later with fruits and insects until it was released. Gongrot *Aking* shares a border with Balpakram National Park to its north and the loris was released into the park at night on 17th April 2005 after persuasion from NV and colleagues. Shortly before, the *jhum* fields had been burnt to be prepared for cultivation. Local people report that many wild animals come into newly burnt fields to eat the shoots that spring up, making this a good period for hunting animals. A questionnaire survey undertaken across 33 *Akings* of Rongra block to assess knowledge of 56 large mammals (including slow loris) revealed that 76% of the respondents claimed to have seen slow lorises, indicating that the animal is probably common in the region (Ved & Sangma, 2007). The forest type in the region is tropical semi-evergreen forest that is disturbed by human activities.

DISCUSSION

The Bengal slow loris, like the other species of the genus *Nycticebus*, is a cryptic nocturnal mammal whose distribution is known only from occasional accounts and a few research studies (Nekaris *et al*., 2008). As for the whole range, the occurrence of slow lorises is not well documented for northeastern India. In this study, we report the occurrence of the species in specific forest patches in three states, namely Meghalaya, Assam and Arunachal Pradesh. We do not

Figure 4. Bengal slow loris kept in captivity in Gongrot Aking, Meghalaya in April 2005.

present encounter rates based on hours spent walking or distance as these sightings were opportunistic and not part of a study aimed to estimate density or abundance of lorises. Systematic studies with repeated transect walks are required to estimate abundance or densities accurately (Buckland *et al*., 1993; Duckworth, 1998). Any encounter rates calculated from this report might not be true representations of the abundance of the loris at these sites. If calculated, our encounter rates (0.28-1.0 lorises/km) would be higher than other reported rates for the same species (0.22 lorises/km: Swapna *et al*., 2008; 0.03-0.33 lorises/km: Radhakrishna *et al*., 2006; 0.10-0.13/km: Nekaris & Nijman, 2007) as well as other species of the genus (0.05-0.74 lorises/km: Nekaris & Nijman, 2007). Given that there are no replicates for any of our walks, these rates would be inflated figures.

The distribution and population densities of the Bengal slow loris in Northeast India are known to be affected by a number of factors including habitat destruction, subsistence hunting, and trade (Radhakrishna *et al*., 2006). However, the lack of information on area of occurrence and the species ecology is a major hurdle to monitoring impacts of these factors on slow loris populations throughout their range. A number of other factors – most of them unique to this region, further complicate the matter. Anthropogenic activities are known to have resulted in widespread fragmentation of the forest cover of the northeastern states, and protected areas as well as most of their animal populations are not contiguous (Choudhury, 2001). While long-term studies on the Sunda slow loris have shown that the species does not necessarily depend on undisturbed primary forest (Wiens, 1995), the reaction of the Bengal slow loris to such habitat disturbance remains to be examined. Compounding the problem is the fact that several slow loris habitats are outside protected areas. Insurgencies affect many of the states, and the consequent security issues associated with conducting field research at night are a deterrent for researchers to take up detailed studies of nocturnal species like the loris.

In Northeast India the Bengal slow loris *Nycticebus bengalensis* is affected by trade as well as subsistence hunting (Radhakrishna *et al*., 2006). Local knowledge of lorises is often high due to such activities, as indicated by Ved and Sangma's (2007) survey. Reports of slow lorises in captivity are numerous throughout the range of these animals, including northeastern India. While slow lorises are captured to be kept as pets in many tribal communities (Duckworth *et al*., 1999), they are also captured for trade purposes (Nekaris & Nijman, 2007). After an assessment of the extent of unsustainable trade in slow lorises, the genus was moved from Appendix II to Appendix I of CITES (CITES, 2008), awarding it the highest level of protection and banning all international trade. Efforts are required to document the intensity of trade and capture of the slow loris in northeastern India in order to determine the effect of such activities on local loris populations.

The slow loris is known to vary extensively across its range, and the recent division into five species is based on genetics, morphological differences and pelage characteristics (Nekaris *et al*., 2008). The importance of documentation of pelage characteristics in *Nycticebus* was brought to light by Nekaris and Jaffe (2007), who used pelage characteristics to identify source locations of slow lorises recovered from the pet trade circuit. Recent research has shown facial markings to play a role in social communication (Bearder, 1999), and isolated populations of nocturnal mammals might have evolved different facial patterns. Given that the slow loris is a commonly traded species, it is important to document pelage variation in both color and facial markings through the range of the species to aid identification of the source of recovered animals/skins. We provide photographs of the species from two of the states, and while we do not have many replicates from each population to document individual variation, these pictures might prove useful in bulding photo libraries of animals from different sites. With the advent of powerful digital cameras, it is easier to photograph nocturnal mammals today than it was even a few years ago, and we advocate photographic documentation of populations of lorises. This resource would especially benefit scientists and conservation biologists if these were made available in the public domain.

Conservation efforts for the slow loris must be directed towards identifying the most important habitats, and not only preserving these, but also connecting them with forest corridors. The efforts of conservation-oriented organizations are vital in raising awareness in tribal communities about biodiversity and consumption of natural resources (including subsistence hunting).

ACKNOWLEDGMENTS

We acknowledge A.C. Williams, Samrakshan Trust and T. Karthik for helping with logistics and assistance in Meghalaya; and P. Barua, Range Forest Officer, Jeypore for providing details of the rescued slow loris at Dirok. K. Varma and D. Mudappa were extremely generous in sharing the details of the sighting in Deban. We thank A.C. Williams, M.D. Madhusudhan and K. Varma for the photographs of the lorises and S. Radhakrishna for her encouragement to publish these sightings. S. Radhakrishna, R. Vijayan and A. Nekaris gave us valuable comments that improved the draft.

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