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Cover: A female Javan Leopard *Panthera pardus melas* in rehabilitation phase at Cikananga Wildlife Center. © Yayasan Cikananga Konservasi Terpadu.

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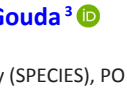

SHORT COMMUNICATION

Effects of a Bengal Slow Loris *Nycticebus bengalensis* (Primates: Lorisidae) bite: a case study from Murlen National Park, Mizoram, India

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Abstract: Lorisids are the only known venomous primates. Threatened by habitat loss and pet trade, lorises and the effects of their bite, have received little attention to date. Given the growing number of accounts of bites by lorises on humans and paucity of information on their venom, here we present a case study on the context and results of a Bengal Slow Loris bite that occurred in the vicinity of Murlen National Park, Mizoram, India.

Keywords: Awareness, conservation, Lorisids, Murlen village, northeastern India, threatened species, victim.

The Bengal or Northern Slow Loris *Nycticebus bengalensis* is an arboreal strepsirrhine primate (Lorisidae) and one of the eight species in the same genus. Found in the tropical evergreen, semi-evergreen, tropical mixed-deciduous, and sub-tropical broadleaf forests of southeastern Asia (Choudhury 2001; Radhakrishna et al. 2006), it is part of a family that includes the only known venomous primate species (Choudhury 2001; Nijman et al. 2014). Slow lorises are distributed across northeastern India, eastern Bangladesh, southern China, Myanmar, northern and central Vietnam, Laos, Cambodia, Thailand, and possibly in northern Peninsular Malaysia (Nekaris et al. 2013; Nijman et al. 2014; Roos et al. 2014). In India, *N. bengalensis* can be found in the northeastern states of Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, and Tripura (Choudhury 1992, 2001; Kumar 2009; Das et al. 2016). It is categorized as a Schedule I species under India's Wildlife Protection Act, 1972, Appendix I species by CITES (Nekaris & Nijman 2007) and is also listed as 'Endangered' as per the IUCN Red List of Threatened Species (Nekaris et al. 2020). Anthropogenic activities such as clearing of forests, forest fires, shifting cultivation, hunting, poaching, pet trade, and importance given to ethno-medicinal uses, all present direct and indirect threats to lorises, and increase the risk of human encounters by several fold (Rowe 1996; Radhakrishna et al. 2006; Nekaris et al. 2013; Kumar et al. 2014; Perkin 2019; Lyngdoh et al. 2021). Cases of slow loris getting electrocuted and frequent encounters in human dominant areas have also increased in Mizoram due to recent incidences of forest fire in the state (Sushanto Gouda pers. obs. since 2016). When threatened or disturbed, slow lorises tend to bite using teeth resembling a 'needle-like toothcomb' and, in the process, they release a venomous secretion obtained from licking a specialised brachial sebaceous

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gland (Rode-Margono & Nekaris 2015). Upon mixing with its saliva, this secretion can cause anaphylactic shock in humans and other mammals when bitten (Wilde 1972; Nekaris et al. 2013; Gardiner et al. 2018). Over the past several decades, many cases of bites by slow lorises have been reported, particularly in the past 10 years (Wilde 1972; Kumar et al. 2014; Madani & Nekaris 2014; Inoue et al. 2021). Here we describe an actual incident, which involved a Bengal Loris biting a person from Murlen village, a largely rural community located on the periphery of Murlen National Park (MNP) in Mizoram, India.

Study Area

This report originates from Murlen village (23.671^{0}N, 93.273^{0}E), a fringe village located just outside MNP about 30 km from the Myanmar border. MNP is a protected area of 100 km² which falls within the Indo-Burma Biodiversity hotspot. Situated in the Champhai district of Mizoram, the area is very close to the Chin Hills. MNP has six fringe villages, including Murlen village, which has a human population of 240 individuals. Locals here are dependent mainly on agriculture, and practice the slash and burn cultivation method. The individual loris discussed herein was eventually released back into the wild unharmed after being rescued from the site where the incident occurred.

Case report

On 22 of January 2022, our team visited a shifting cultivation area, approximately 4 km from Murlen village. This is an area where local people were clearing the secondary forest for subsistence agriculture. During our visit, we came upon a Bengal Slow Loris on a branch at the top of a *Castanopsis tribuloides* tree (local name- *Thing-sia*). The slow loris was in the process of descending the tree as it was about to be cut down (Image 1). Unfortunately, members of the local community decided they were going to kill it, due in part to the fact that no vegetation remained in the surrounding areas to which it could escape. However, we intervened, offering to rescue and release it into MNP. After dropping down to the ground, the loris tried to hide among branches that had been felled from the tree. Before we could reach the spot where it was 'hiding', a local farmer (age 54) tried to capture it with his bare hands and in the process he was bitten on the middle finger of his left hand. The animal held fast for at least two minutes (Image 2) and after some struggle, we forcibly extricated the finger also freeing the loris. The bite victim insisted on pulling off some body hair from the loris and applied it to his wound, a decision influenced by the local belief that slow loris hairs have great medicinal value and can reduce further bleeding or ill effects. Eventually, AKB placed a jacket over the loris after which it was temporarily placed into a carry bag, made locally from old cotton clothing, for its own protection and safety of everyone else. The bite victim also applied extract to the wound ground from leaves of the plant *Thunbergia grandiflora* (local name-*Va-ko*) (Image 3). We were told this was also to stop the bleeding, and prevent further infection.

Approximately 15 minutes after being bitten, the farmer began to experience severe stomach pain. This was followed by chest pain, difficulty in breathing, nausea, headache, and temporary loss of vision. His face started to swell especially his lips and he began to feel cold. He also mentioned feeling a 'flow of current'

Image 1. Bengal Slow Loris *Nycticebus bengalensis*: a—Before the attempted capture and biting incident | b—upon release back into the wild.

Image 2. Bite marks from the Bengal Slow Loris.

Image 3. Leaves of *Thunbergia grandiflora*, which was applied on the bite victim's wound to stop the bleeding.

around the wound and even across his whole hand and then pain around his mouth. Because the location was very remote (i.e., ~ 50 km from the nearest hospital in the town of Champhai), we could provide no additional medication to him. Upon consulting other farmers who were working in a nearby forest, the bite victim was provided with 500 mg of Paracetamol (Acetaminophen: a pain reliever), 250 mg of Avil (Pheniramine maleate: an antihistamine), and some warm water. He then attempted to rest by laying down, during which he was frequently spitting up, experiencing pain in his neck, and was not able to talk.

After three hours of rest, the farmer felt better and was able to walk back to the village. However, on his way back, he complained of a headache and stomach pain. Upon reaching the village, we went to the nearest forest adjacent to MNP, and safely released the slow loris (Image 1). When we inquired about the health condition of the farmer the next day, he had completely recovered with no symptoms of the slow loris's venom, nor did he need or ask for any additional medications.

Discussion

Although the slow loris is generally regarded as a shy and cryptic species, it is also frequently exploited for the pet trade through-out southeastern Asia (Nijman & Nekaris 2014; Lyngdoh et al. 2021). In the northeastern states of India, locals are known to hunt and also consume the meat of slow loris, whereas their fur is believed to have ethno-medical uses in treating excessive bleeding and other injuries (Jugli et al. 2020). Most cases involving a venomous loris bite on humans across southeastern Asia are reported for Pygmy Slow Loris (*N. pygmaeus*), although others have included the Bengal Slow Loris (*N. bengalensis*), Philippine Slow Loris (*N. menagensis*) and Javan Slow Loris (*N. javanicus*) (Gardiner et al. 2018). In prior cases, the impact of Slow Loris bites has ranged from passing or fleeting to more long lasting effects or complications, with healing time ranging from one day to >8 months (Rode-Margono & Nekaris 2015; Inoue et al. 2021). The farmer in this case had previously also been bitten by a highly venomous red-tailed Bamboo Pit Viper (*Trimeresurus erythrurus*) which could have led to greater immunological resistance, and thus aided his speedy recovery. Avil (Pheniramine maleate) and paracetamol (Acetaminophen) are not necessarily known to be prescribed drugs for loris bites, yet this combination of antihistamine and pain reliever may have proven effective in this case.

Finally, after interviewing some local people from the village around MNP, we learned that in past years, there were at least three cases of slow loris bites. We found that two of the victims reported similar experiences to the one of the farmer we describe here, whereas the other suffered no symptoms at all. Though the effect seemed in our case to last only a few hours, considering the remoteness of the area and the lack of medical facilities, enhanced awareness about the outcomes of potential human interactions with lorises is important to the future safety of both primates and humans. This includes the role that habitat loss, particularly due to extensive shifting cultivation practices and logging, may play in the future and inevitability of such interactions.

The participation of both local communities and forest departments is urgently needed to foster coexistence with, and possibly even stewardship of, slow lorises.

Consent: Written informed consent was obtained for the publication of this report and all accompanying images.

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