Nocturnal mammals and Ba'Aka culture, Dzanga-Sangha Protected Areas, Central African Republic

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Introduction

Research on African nocturnal mammals, particularly strepsirrhines, remains under-represented in contrast to diurnal counterparts, especially in certain regions (Lambert et al., 2006; Laurance et al., 2008; Nekaris and Nijman, 2013). Pottos and angwantibos (*Perodicticus* spp. and *Arctocebus* spp.) are both listed as Least Concern on IUCN's Red List of Threatened Species, however, their populations are declining due to habitat fragmentation (Bearder et al., 2008; Oates et al., 2016). Additionally, bushmeat hunting and Local Ecological Knowledge (LEK) occurs within human communities, which may cause added stress on wildlife species populations, similar the rapid decline of Asian pangolin species (*Manis* spp.) and Asian lorises (*Nycticebus* spp. and *Loris* spp.) (Miard et al., 2017; Nekaris et al., 2010; Nekaris and Nijman, 2014, Svensson and Friant, 2014; Svensson et al., 2016; Waterman et al., 2014).

The nocturnal mammal community in Central African Republic (CAR) has rarely been studied. We aimed to 1) determine most frequently sighted nocturnal mammal species in Dzanga-Sangha Protected Areas (APDS) during the study period; 2) assess behaviours on first contact of nocturnal primate species; 3) identify nocturnal mammal species most associated with traditional practices.

Methods

We carried out 44 nocturnal inventory-style walking surveys in the Dzanga-Sangha Protected Areas (28°13'26˚N, 16°11'26˚E) in southwestern CAR between 19:00 h – 03:00 h during May-July 2019, across seven sites: three forest camps within the Dzanga-Sangha National Park and four sites in the pre-park, including three villages – Bayanga, Mossapoula and Yandoumbé.

Walking routes were chosen at random due to irregular elephant activity. Upon detection of mammal species, using head torches with red filters to detect eye-shine, we documented the time, species, moon phase and GPS location. We recorded additional data for nocturnal primates, i.e. animal height in tree, tree height and tree diameter at breast height (DBH) and

continuous behavioural observations of nocturnal primates at point of first contact using an ethogram of 22 behaviours (Altmann, 1974; Martin and Bateson, 2007).

We set up five motion-activated, infrared wildlife camera traps for 29 days in 29 random locations at a mean height of 7.38 m and we moved them every 1-3 days, following methods used by Shannon et al. (2014) to maximise detection rates of rare and elusive species (Rovero et al., 2014). Quantitative datasets were analysed in IBM SPSS 25.

Additionally, we conducted semi-structured group interviews with 70 Ba'Aka villagers using trigger cards of 22 species and used a combination of open and closed questions that filtered towards the nocturnal species, to encourage freelisting and discussions. We documented key words mentioned in association with each nocturnal species and imported them into NVivo (QSR International, Version 12, 2018) to identify word frequencies and weights. We compared key words mentioned between the three villages for a cultural consensus in UCINET 6 for Windows.

Results

The most frequent species sighted were blue duikers (*Philantomba monticola*) (n = 49); palm civets (*Nandinia binotata*) (n = 35); Milne-Edwards's pottos (*P. edwardsi*), including four infants (n = 29) and Gabon squirrel galagos (*Sciurocheirus gabonensis*) (n = 18). We confirmed the presence of golden angwantibos (*A. aureus*) (n =2) in both the national park and pre-park. More ungulates (*Cephalophinae* spp., *Tragelaphus* spp.) were sighted in the national park (n = 71) than pre-park (n = 3). Species sighted nearest to villages were pottos, dwarf galagos (*Galagoides*) and white-bellied tree pangolin (*P. tricuspis*). From the total number of sightings (n=232), we tested the time of the highest number of total species sightings (22:00 h - 23:00 h, n = 53) by running a Pearson's Chi-square test, which showed a significant difference (χ^2_{200} = 245.011, p<0.015).

We documented over 10 hours of nocturnal primate behavioural observations upon first contact, including potto (344 mins) being the most active (Locomotion = 76 occurrences) and angwantibo (79 mins) being the least active (Freezing = 4 occurrences). Gabon squirrel galagos were the most vocal (21 occurrences). Camera traps resulted in only 16 nocturnal images: the only one nocturnal primate being an unidentified galago.

The interviews showed that Ba'Aka hunt certain nocturnal species for spiritual protection (genets, angwantibos), protein sources (civets, genets, pangolins), for medicinal purposes (angwantibos) and taboos (western tree hyrax) and a consensus was reached across the three villages.

Discussion

Little nocturnal research has been carried out in CAR and it is unknown how large the nocturnal mammal populations are in the APDS. Remis and Jost Robinson (2014, 2017) studied Ba'Aka hunting preferences and duiker populations for subsistence, of which blue duiker were the most numerous ungulate in this study. We clarify that some cryptic

nocturnal species are truly significant in Ba'Aka culture, particularly angwantibos for spiritual and medicinal properties.

With the rise in both unsolicited logging and rural human populations, nocturnal mammals in the APDS have many threats (Noss, 1998). Continued field research in CAR will enable discoveries regarding the distribution, population trends, behaviour and ecology of nocturnal African mammals. The effects of habitat alterations, timber extraction and hunting may result in these species being placed into higher threat categories.

An angwantibo in the study site

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