

PAPER • OPEN ACCESS

PrimaTourism: Preliminary study on activity budget of *Presbytis neglectus* with insights on local people perception on the product's potential economic value in Johor

To cite this article: M A B Abdul-Latiff *et al* 2019 *IOP Conf. Ser.: Earth Environ. Sci.* **269** 012006

View the [article online](#) for updates and enhancements.



IOP | ebooks™

Bringing you innovative digital publishing with leading voices to create your essential collection of books in STEM research.

Start exploring the collection - download the first chapter of every title for free.

PrimaTourism: Preliminary study on activity budget of *Presbytis neglectus* with insights on local people perception on the product's potential economic value in Johor

M A B Abdul-Latiff^{1*}, M F Najmuddin¹, S. K. Haneef¹, A. Nabil¹, R Shahrool-Anuar², B M Md-Zain³

¹Centre of Research for Sustainable Uses of Natural Resources, Faculty of Applied Sciences and Technology, Universiti Tun Hussein Onn Malaysia, KM1 Jalan Panchor, 84600, Muar, Johor, Malaysia

²Panz Green Resources, 535, Air Tawar 5, 81900 Kota Tinggi, Johor

³School of Environmental and Natural Resource Sciences, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, 43600, Bangi, Selangor, Malaysia

Email: latiff@uthm.edu.my

Abstract. The newly classified Schlegel's Banded Langur, *P. neglectus* in Malaysia are one of the most understudied primates in Malaysia. Unknown population status and distribution coupled with highly fragmented population recorded in Malaysia demands immediate need to study the fundamental aspects of the species such as daily activity budget. PrimaTourism are also suggested as a viable sustainable conservation measures for this highly threatened species. Thus, the objectives of this study are to identify the daily activity budget of *P. neglectus* in Kampung Johor Lama, Kota Tinggi, Johor, and also identify the potential of primate-based tourism in Kampung Johor Lama. Scan sampling was employed to record activity budget of *P. neglectus*. A total of 16 individuals of *P. neglectus* were observed in Kampung Johor Lama. A total of 8400 minutes of observation time was obtained. On average, *P. neglectus* spent most of their time resting (36.85%), moving (35.65%) and feeding (21.79%). The potential of PrimaTourism were assessed based on questionnaire distributed among local people in Kampung Johor Lama. Local people expressed their willingness to be involve in PrimaTourism activities and believe that this will serve as their alternative source of income and also sustainable well-being of the species in the area.

1. Introduction

Colobines are a group of primates ranging in southeast Asia and Africa that feed naturally on leaves, fruits and seeds of trees, and other non-food item, which contain high amounts of fibre and secondary plant compounds [1,2]. Schlegel's Banded Langur, *Presbytis neglectus* are previously classified as *P. femoralis femoralis* and have been elevated to distinct species level based on molecular systematics, separating it from *P. f. robinsoni* [3]. Banded langur's body is covered with black fur on their body with a white zone ventrally and white bands on the inside of the thighs [4]. This species are primarily arboreal



due to food availability and generalized as folivorous [5]. *P. neglectus* are strictly distributed in southern Peninsular Malaysia and marginally in Singapore [4,6]. Generally, social groupings of *P. neglectus* along with other *Presbytis* members consists of single adult male and multi adult females [5].

Previous study conducted on this species are very limited and only using *P. neglectus* to represent the species to understand the evolutionary history of *Presbytis* species groups [3,7]. Using molecular approach [8,9,10] to understand the population genetics of *P. neglectus* should be carried out immediately to determine the genetic diversity of the species in Johor. Information on behaviour and ecology of *P. neglectus* in Malaysia are non-existent, thus highlighting the needs to understand one of the most fundamental aspects in primate's conservation, the daily activity budget [11]. Daily activity budget is the collection of data about the behaviour of primates for one whole day comprising of feeding, resting, moving, allogrooming, autogrooming, vocalization, playing and others [11]. Data gathered will not only provide us with baseline data on behaviour of *P. neglectus* such as allocation for feeding time, but also can be utilized in developing PrimaTourism module in the future. We define PrimaTourism as a form of responsible visit to natural or artificial areas to observe, learn and appreciate primates in which it significantly contributes to sustainable conservation of primates. Thus, the objectives of this study is to study the activity budget of *P. neglectus* in Kampung Johor Lama and to assess the perception of local people on the product's potential economic value.

2. Methodology

This study was conducted in Kampung Johor Lama, Johor, Malaysia (Figure 1). Scan sampling method were employed in recording activity budget of *P. neglectus* with 10 minutes interval starting from 0700 h to 1900 h in August 2017. Information such as population size, number of individuals, behaviour such as feeding, grooming, mating, playing and others are recorded and observed visually using NIKON P510. The Schlegel's banded langur in Kampung Johor Lama consists of 16 individuals which are separated into two groups (Table 1 and 2). The first group (Dara) comprises of one adult male and three adult females while second group (Puteh) comprises 12 individuals, 10 adults and two subadults. Daily activity budgets were calculated by averaging the individuals number in the scan sampling to the percentages of activity studied [12]. The questionnaire distributed to local people consists of two sections; demographic information and perception of local people towards *P. neglectus* as PrimaTourism product in Kampung Johor Lama (Table 3).



Figure 1. Location of Kampung Johor Lama, Kota Tinggi, Johor.

Table 1. Individuals in group one (Dara)

Individual	Age class	Sex
Individual 1	Adult	Male
Individual 2 (Dara)	Adult	Female
Individual 3	Adult	Female
Individual 4	Adult	Female

Table 2. Individuals in group two (Puteh)

Individual	Age class	Sex
Individual 5	Adult	Male
Individual 6	Adult	Female
Individual 7	Adult	Female
Individual 8	Adult	Female
Individual 9	Adult	Female
Individual 10	Adult	Female
Individual 11	Adult	Undetermined
Individual 12 (Puteh)	Adult	Undetermined
Individual 13	Adult	Undetermined
Individual 14	Adult	Undetermined
Individual 15	Subadult	Undetermined
Individual 16	Subadult	Undetermined

Table 3. List of question asked to assess the perception of local people in kampung Johor Lama towards developing *P. neglectus* PrimaTourism product

No.	Question
Q1	Schlegel's Banded langur is suitable to be PrimaTourism product in Kampung Johor Lama
Q2	Location of Kampung Johor Lama is suitable to be the destination of primate based tourism for Schlegel's banded langur
Q3	Conservation and rehabilitation of Kampung Johor Lama can be improved with PrimaTourism product
Q4	PrimaTourism based on Schlegel's banded langur will attract more tourist to Kampung Johor Lama
Q5	PrimaTourism in Kampung Johor Lama will increase the awareness on importance of Schlegel's banded langur to ecosystem
Q6	Local community should be involved in PrimaTourism based on Schlegel's banded langur in Kampung Johor Lama
Q7	PrimaTourism based on Schlegel's banded langur in Kampung Johor Lama will help local community to generate additional income

3. Results

Observation were conducted for 28 days, yielding 8400 minutes of activity budget data for *P. neglectus* in Kampung Johor Lama. We targeted to obtain more than 10,000 minutes of activity budget for the species, however, due to unpredictable behaviour such as random foraging and sleeping sites, weather and the populations retreating to inaccessible mangrove areas, this target was not achieved. The biggest allocation for activity budget of *P. neglectus* in Kampung Johor Lama was devoted to resting (36.85%), followed by moving (35.65%) and feeding (21.79%). Grooming (2.06%), playing (1.91%) and vocalization (1.73%) were also recorded during observations (Figure 2). Expectedly, Schlegel's banded langur exhibited two peaks of feeding behaviour from 0700 h to 0900 h, with another peak occur in the evening from 1800 h to 1900 h.

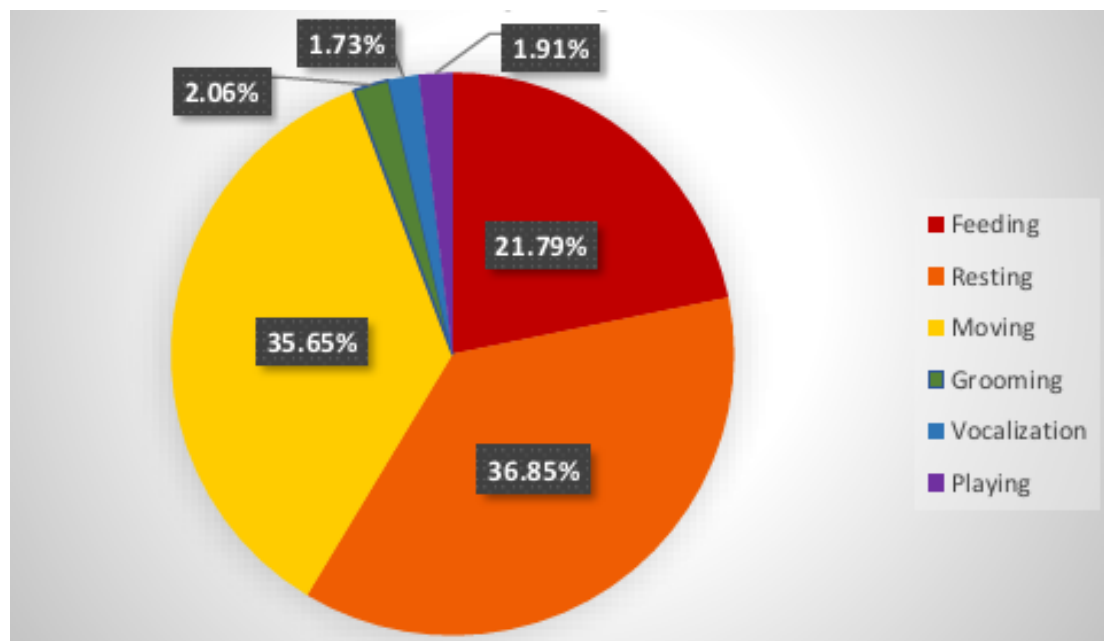


Figure 2. Summary of Activity Budget for *P. neglectus* in Kampung Johor Lama, Johor.

A total of 35 respondents have been randomly selected to participate in our survey to understand local people's perception on potential economic value of *P. neglectus* as PrimaTourism product. A total of 25 male respondents (71.43%) and 10 females (28.57%) participated in this survey with the highest age classes of respondents were 41-60 years old (45.71%), followed by 61-80 years old (25.71%), 21-40 years old (17.14%), more than 80 years old (8.57%) and less than 20 years old (2.86%). More than 40% of the respondents were unemployed and 28.57% are working on their own. Based on the survey conducted, 94% of the respondent agree that *P. neglectus* has the potential to be a PrimaTourism product in Kampung Johor Lama. While 85% of the respondents believe that PrimaTourism based on *P. neglectus* will attract more tourist to Kampung Johor Lama and may serve as educational and conservational tool, 8% disagree that this measures will increase the awareness on importance of Schlegel's banded langur to ecosystem (Figure 3).

4. Discussion

Resting, moving and feeding dictates the largest amount of time spent by *P. neglectus* in Kampung Johor Lama. This is comparable to other studies on Colobines, such as on *Trachypithecus obscurus halonifer* in Penang Botanical Garden [11], *T. o. obscurus* in UKM Bangi Campus [12], white headed langurs in Fusui [13], Francois' langur in China [14] and proboscis monkey in Sabah [15]. However, this study recorded lower feeding behaviour (21.79%) as compared to *T. o. obscurus* (40%) [12] and *T. o. halonifer* (39%) [13]. Feeding allocation of *P. neglectus* in Kampung Johor Lama were relatively constant during our observation as the availability of food in the village is abundance. Feeding behaviour of black snub-nosed monkey (*Rhinopithecus bieti*) were altered corresponding with the seasonality of food [16].

Activity budget for resting (36.85%) are comparable to previous study [12,13,14], although lower than reported in proboscis monkey (76.5%) [15]. This pattern is likely related to digestions of their fiber rich foliage diet [17]. However, both resting and feeding behaviour are influenced by temperature variation, mean annual temperature and the percentage of leaves in the diet [18]. The percentage of playing behaviour (1.91%) corresponds well with those of *T. o. halonifer* (1%) [11]. Playing behaviour are usually observed among juveniles and rarely among adults [19] which corresponds well with finding here as we only observed two subadults in the area. Future study are suggested to conduct intensive

study on genetics, activity budget, ranging and feeding ecology of the species, not only to serve conservation plan for the species [20], but also to develop PrimaTourism module in Kampung Johor Lama.

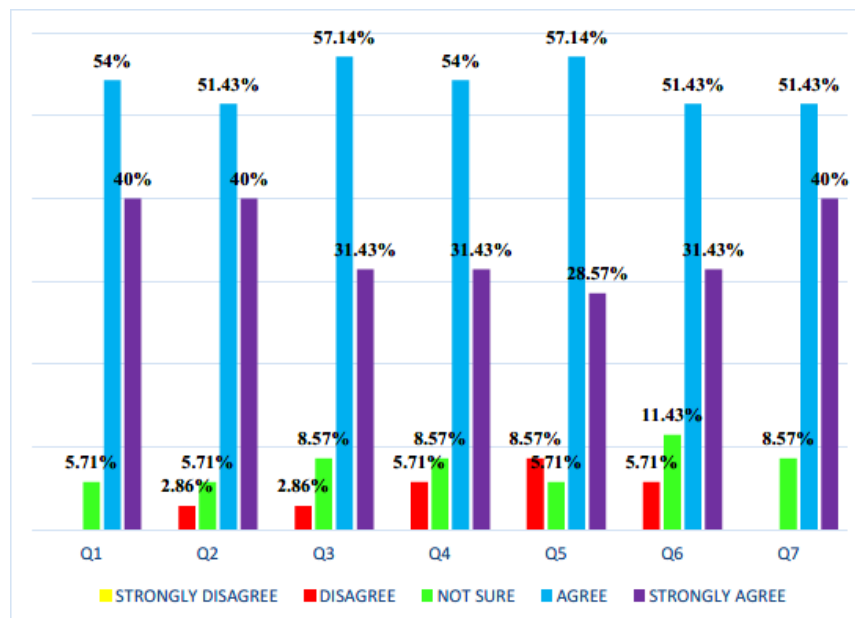


Figure 3. The perception of local people towards potential economic value of PrimaTourism based on *P. neglectus* in Kampung Johor Lama.

5. Conclusion

Activity budget of *P. neglectus* in Kampung Johor Lama have been successfully identified in this preliminary study. Understanding the basic elements of Schlegel's banded langur behaviour such as activity budget is important for conservation purposes and also to develop PrimaTourism module in Kampung Johor Lama.

References

- [1] Nijboer J and Clauss M 2006 The digestive physiology of colobine primates *Fibre intake and faeces quality in leaf-eating primates* **9**.
- [2] Kirkpatrick R C 1999 In Dolhinow P and Fuentes A (eds) *The Nonhuman Primates* pp 93–108 Mayfield Publishing Co., Mountain View, CA.
- [3] Abdul-Latiff M A B, Baharuddin N H, Abdul-Patah P, Md-Zain B M 2018 Is Malaysia's Banded langur, *Presbytis femoralis femoralis*, actually *Presbytis neglectus neglectus*? Taxonomic revision with new insights on the radiation history of the *Presbytis* species group in Southeast Asia *Primates* published online 23 November 2018.
- [4] Groves C P 2001 *Primate taxonomy* Smithsonian Institution Press, Washington & London 350 pp.
- [5] Oates J F and Davies A G 1994 What are the colobines? In Davies A G and Oates J F (ed.) *Colobine monkeys: their ecology, behaviour and evolution* pp 45-73 New York: Cambridge University Press.
- [6] Brandon-Jones D, Eudey A A, Geissmann T, Groves C P, Melnick D J, Morales J C, Shekelle M and Stewart C B 2004 Asian primate classification *Int. J. Primatol.* **25** 97-164.
- [7] Vun V F, Mahani M C, Lakim M, Ampeng A and Md-Zain B M 2011 Phylogenetic relationships of leaf monkeys (*Presbytis*; Colobinae) based on cytochrome *b* and 12S rRNA genes *Genet. Mol. Res.* **10** 368-381.

- [8] Md-Zain B M, Abid-Kamal S N A, Aifat N R, Abdul-Latiff M A B, Mohd-Hashim A, Ampeng A, Yaakop S and Samat A 2018 Molecular identification of shark fins in Malaysian Borneo's local markets *Biodiversitas Journal of Biological Diversity* **19** 1035-1043.
- [9] Md-Zain B M, Abdul-Mutalib S A, Aifat N R, Masstor N H, Mohd-Yusuf N S, Mohd-Hasim A, Abdul-Latiff M A B, Yaakop S and Samat A 2018 Molecular phylogenetic inference of White-Spotted Guitartfish (*Rhynchobatus australiae*) collected from local Malaysian fish markets *Biodiversitas Journal of Biological Diversity* **19** 1382-1386.
- [10] Abdul-Latiff M A B, Aifat N R, Yaakop S and Md-Zain B M 2017 A noninvasive molecular approach: Exploiting species-locus-specific PCR primers in defeating numts and DNA cross-contamination of Cercopithecidae *J. Anim. Plant Sci.* **27** 1015-1023.
- [11] Md-Zain B M and Ch'ng C E 2011 The Activity Pattern of a Group of Cantor's Dusky Leaf Monkeys (*Trachypithecus obscurus halonifer*) *Int. J. Zool. Res.* **7** 59-67.
- [12] Ruslin F, Yaakop S and Md-Zain B M 2014 A preliminary study on activity budget, daily travel distance and feeding behaviour of long-tailed macaques and spectacled dusky leaf monkey in Bangi campus of Universiti Kebangsaan Malaysia, Selangor *AIP Conference Proceedings* **1614** 688-692.
- [13] Li Z and Rogers E 2004 Habitat quality and activity budgets of White-headed langurs in Fusui, China *Int. J. Primatol.* **25** 41-54.
- [14] Zhou Q, Wei F, Huang C, Li M, Ren B and Luo B 2007 Seasonal variation in the activity patterns and time budgets of *Trachypithecus francoisi* in the Nonggang Nature Reserve, China *Int. J. Primatol.* **28** 657-671.
- [15] Matsuda I, Tuuga A and Higashi S 2009 The feeding ecology and activity budget of proboscis monkeys *Am. J. Primatol.* **71** 478-492.
- [16] Ding W and Zhao Q-K 2004 *Rhinopithecus bieti* at Tacheng, Yunnan: diet and daytime activities *Int. J. Primatol.* **25** 583-598.
- [17] Dasilva G L 1992 The western black-and-white colobus as a low-energy strategist: activity budgets, energy expenditure and energy intake *J. Anim. Ecol.* 79-91.
- [18] Korstjens A H, Lehmann J and Dunbar R I M 2010 Resting time as an ecological constraint on primate biogeography. *Anim. Behav.* **79** 361-374
- [19] McKenna J J 1982 Primate field studies: the evolution of behavior and its socioecology In Fobes J L and King J E (ed.) *Primate Behav.* pp 1-52 New York: Academic Press.
- [20] Abdul-Latiff M A B, Abdul-Patah P, Yaakop S and Md-Zain B M 2017 Aiding pest control management of long-tailed macaques (*Macaca fascicularis fascicularis*) in Malaysia by using molecular markers of mitochondrial DNA *AIP Conference Proceedings* **1891** 020003.

Acknowledgement

We are deeply indebted to Department of Wildlife and National Parks that provided us with the necessary facilities and assistance for fecal sample collections. The authors acknowledge Universiti Tun Hussein Onn Malaysia for providing necessary funding, facilities and assistance. The research was conducted under research permit (JPHL&TN(IP):100-34/1.24 Jld 8). This research was supported by GPPS-UTHM-U971-2017 provided by ORICC Universiti Tun Hussein Onn Malaysia, Knowledge Transfer Programme (KTP) Grant KTP-PSH-2017 and FRGS/1/2018/WAB13/UTHM/03/2 by Ministry of Education Malaysia.