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Transforming ranging behaviour of Schlegel's Banded Langur (*Presbytis neglectus*) into PrimaTourism product

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Abstract. Schlegel's Banded Langur (*Presbytis neglectus*) are understudied species of leaf-monkey which are distributed in Johor, Malaysia and Singapore. The alternative conservation measures that we propose is highlighting this species as nature tourism product to ensure the sustainability of this highly fragmented species. PrimaTourism is a term referring to primate-based tourism has served the conservation of primate in various country and species worldwide. Thus, the objective of this study is to analyze the ranging behaviour of Schlegel's Banded Langur and evaluate its potential for PrimaTourism programme. Kampung Johor Lama, Kota Tinggi has been identified as the study site to pursue this endeavor, in which two groups of *P. neglectus*, group 1 called "Dara" consists of 4 adults and group 2 called "Puteh" consists of 12 individuals of adults, sub-adults and juveniles are targeted for focal observation. Five checkpoints have been successfully identified throughout 2637 minutes of observation with group 1 spent the longest time in Check Point B for 707 minutes and group 2 spent the longest time in the Check Point A for 420 minutes. Checkpoint A was the most frequented by *P. neglectus* clocking total time for both groups at 1015 minutes. The results indicate reliable sighting in checkpoint A and B for possible PrimaTourism product development. Good sighting, safe distance from the primate, endemism, rarity, attractive behaviour and morphology fulfil the criteria of nature tourism product for the species in Kampung Johor Lama.

1. Introduction

Schlegel's Banded Langur (*Presbytis neglectus*) are categorized under subfamily Colobinae, along with the famous proboscis monkey (*Nasalis larvatus*) of Borneo and other langurs [1]. *P. neglectus* (figure 1) are previously classified as *P. femoralis femoralis*, sharing the same species classifications with *P. f.*



percura (Sumatra, Indonesia) and *P. f. robinsoni* (Northern Peninsular Malaysia and Southern Thailand) [1]. This species however have been elevated from *P. f. femoralis* to *P. neglectus* based on molecular systematics evidence proving monophyletic state of the species as compared to *P. f. robinsoni* which are more closely related to *P. siamensis* (figure 2) [2]. Morphologically, *P. neglectus* can be identified with black fur on their body with a white zone ventrally and white bands on the inside of the thighs [1]. Ranging behaviour is the movement of the animals from their home range which include activities of resting, playing, feeding and reproductive behaviour in nesting site to another area [3]. By studying ranging behaviour of the species, we can determine the most reliable location for sighting of *P. neglectus*. The current population status of *P. neglectus* are largely unknown in its original distribution in Johor and only a small population of this species are distributed in Singapore [4,5]. Some of these populations may no longer exist in protected areas, highlighting the need to acquire the updated data on its current distribution and abundance in Malaysia as their status in Singapore are already classified as endangered [6].



Figure 1. Schlegel's Banded Langur (*Presbytis neglectus*) in Kampung Johor Lama, Kota Tinggi, Johor.

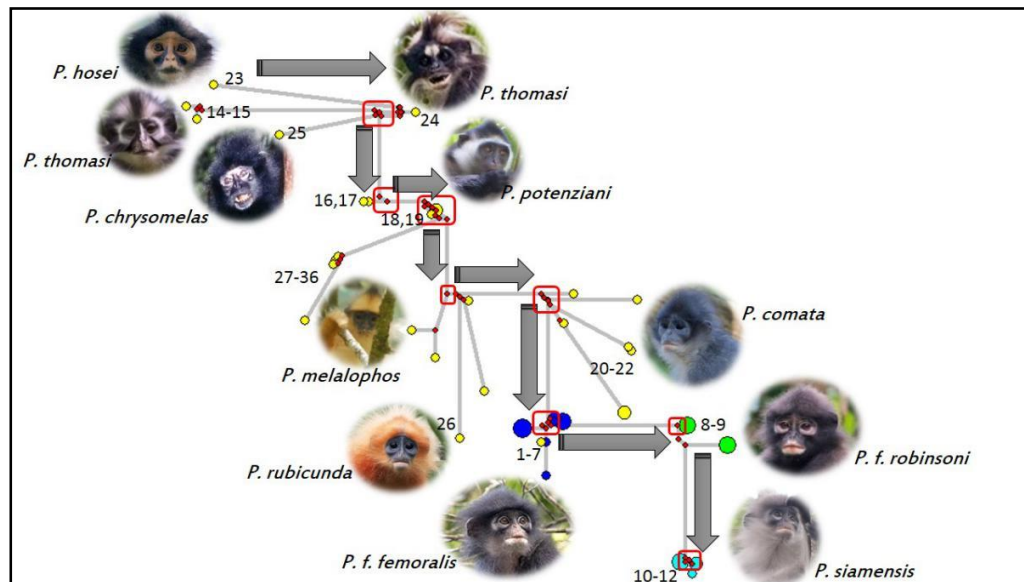


Figure 2. Minimum Spanning Network analysis as presented by Abdul-Latiff et al., [2] proving the new classifications of *P. neglectus* as opposed to *P. f. femoralis*.

PrimaTourism (primate-based tourism) is a branch of the wildlife tourism which involved wild, non-domesticated primate as major attraction and does not involve consumptive activities such as killing or capturing animals [7]. PrimaTourism has been proved as effective countermeasure of conservation in Gorilla Tourism in Rwanda and Baboon Tourism in Kenya [8,9]. Two examples of successful PrimaTourism in Malaysia are in Sabah for proboscis monkey tourism in Klias River and Orangutan in-situ conservation park in Sepilok [10,11]. PrimaTourism include visiting, provisioning and learning by local guide or ranger while maintaining safe proximal distance between human and primate [12]. We coined the word PrimaTourism from the branch of primate-based tourism and we defined it 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. While the ultimate objective of PrimaTourism is conservation of the species, the effects of PrimaTourism can also positively impacted local communities, researcher, tourism industry and authorities [13].

Wild population of *P. neglectus* in Kampung Johor Lama holds significant potential as a nature tourism product. Kampung Johor Lama has been gazetted as heritage village since 1970 and famously known for its historical and heritage values in relation to the old Johor Sultanate. On top of having Museum Johor Lama and riverside view as tourist attraction in the village, the rarely sighted Schlegel's banded langur are ranging freely in the village, enriching the village as a spot for PrimaTourism. However, no previous data are available for us to develop the PrimaTourism module in Kampung Johor Lama. Thus the objective of this study is to identify the potential of PrimaTourism in Kampung Johor Lama by observing the ranging behavior of *P. neglectus*.

2. Methodology

2.1. Ranging behavior of Schlegel's Banded Langur in Kampung Johor Lama

Two groups of *P. neglectus* were selected as the subject for observation of ranging behavior in Kampung Johor Lama. The first group consists of four adults (three females and one male), identified as group

“Dara” and second group consists of 12 individuals, 10 adults and only two sub-adults identified as group “Puteh”. Observation were conducted from 0700 h to 1900 h, including two hours break (1300-1400 and 1600-1700). Sum of 2637 minutes of observation were gathered in 14 days. This study employed focal sampling [14] which means following the targeted group around Kampung Johor Lama from their sleeping sites and estimate time spent in each different feeding or resting site. Observations and data collection were conducted using stopwatch, GPS, camera and video camera.

3. Results

Five checkpoints or significant resting site for Banded Langur in Kampung Johor Lama were successfully identified as checkpoint A, B, C, D and E (figure 3). Table 1 show the total time spent in minutes for Group 1 and Group 2 on each checkpoints. Group “Dara” showed highest number of total minutes spent on one checkpoint (B) with 707 minutes. In contrast, group “Puteh” limited their movement to only checkpoint A, B and D. Checkpoint A and B were observed as consistent checkpoints chosen by both groups as their resting and feeding sites, both clocking over 800 minutes as compared to checkpoint C (180 minutes), D (495 minutes) and E (120 minutes). Another interesting pattern detected was group “Dara” used all checkpoints as their resting or feeding sites, specifically 595 minutes on checkpoint A, 707 minutes on checkpoint B, 180 minutes on checkpoint C, 135 minutes on checkpoint D and 120 minutes on checkpoint E. Group “Puteh” on the other hands, only selected checkpoint A (420 minutes), B (120 minutes) and D (360 minutes) as their resting or feeding sites with no observations ever recorded on checkpoint C and E (0 minutes respectively).

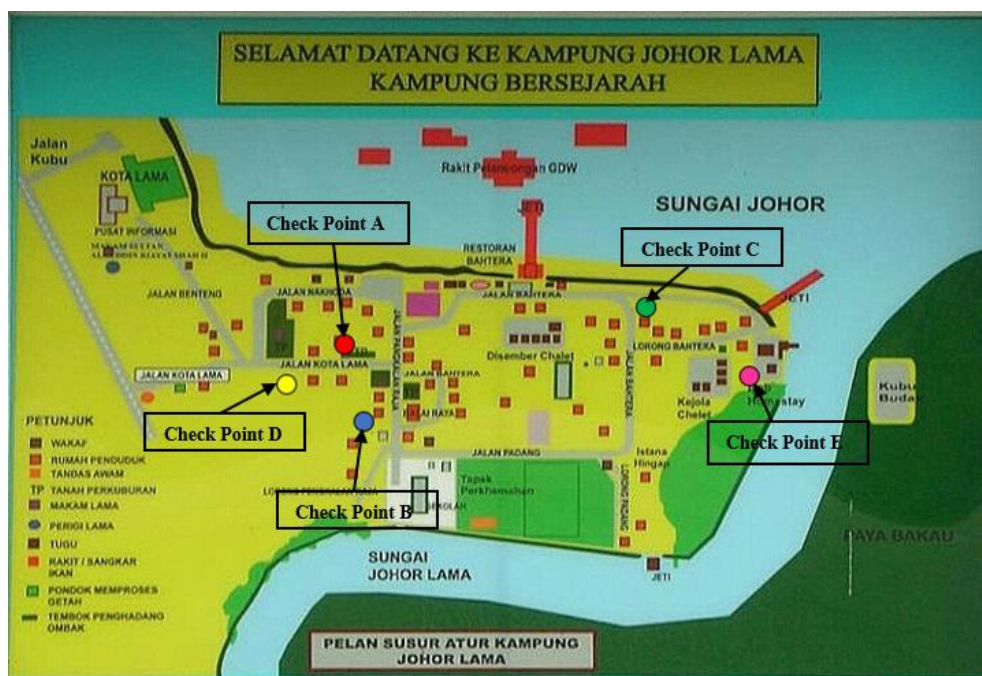


Figure 3. Checkpoints A, B, C, D, and E in Kampung Johor Lama.

Table 1. Total minutes spent for Group 1 and Group 2 on each checkpoint

	CP A	CP B	CP C	CP D	CP E	Total m/Group
Group 1 (Dara)	595 minutes	707 minutes	180 minutes	135 minutes	120 minutes	1737 minutes
Group 2 (Puteh)	420 minutes	120 minutes	0 minutes	360 minutes	0 minutes	900 minutes
Total m/CP	1015 minutes	827 minutes	180 minutes	495 minutes	120 minutes	2637 minutes

4. Discussion

Group “Dara” consists of all adult individuals and smaller group size that may contribute to longer concentrations of one group in certain checkpoints (A and B) as compared to Group 2 consisting of 12 individuals which will easily move from certain checkpoints responding to incoming humans or vehicles. Checkpoint A and B which were selected consistently by both groups most probably due to presence of food source such as rambutan (*Nephilum Lappaceum L.*), mangosteen (*Garcinia mangostana*), oil palm trees (*E. guineensis*) and jackfruit (*Artocarpus heterophyllus*) in checkpoint A and large *Mangifera foetidd* in checkpoint B. Big tree with good canopy cover provides shades and shelters, which are highly favoured by arboreal primates [15]. There was not enough data in this study to suggest any significant association of ranging behavior with diet composition or food selection [16], we believe they are highly associated as *P. neglectus* depends heavily on food patch in the village.

Criteria presented in Table 2 are important elements that must be taken into considerations in developing viable nature tourism product, in this case using *P. neglectus* as PrimaTourism product [17]. Schlegel’s banded langur in Kampung Johor Lama scored 6/7 from the criteria listed in Table 2 which indicate a promising potential of PrimaTourism in the future. Primate-based tourism as recommended by Russon & Wallis [12] highlights protection of primate species and their habitat strictly following their natural behavior and biology. This can be fulfilled in Kampung Johor Lama by recommending a safe distance for observations, prohibiting any feeding activities by tourist and avoiding any stress-inducing actions towards *P. neglectus*. Future study are suggested to include more intensive ranging and feeding behavior of *P. neglectus* in Kampung Johor Lama as employed by Ruslin et al., [18]. Studying evolutionary history using non-invasive samples such as fecals [19,20,21,22] of *P. neglectus* in Kampung Johor Lama may also become interesting content to develop PrimaTourism in the area.

Table 2. Scoring of essential criteria of *P. neglectus* as nature tourism product as proposed by Kueh & Park [17].

No.	Criteria	Yes (✓) / No (X)
1.	Reliable sighting	✓
2.	Attraction behavior	✓
3.	Endemism	✓
4.	Rarity	✓
5.	Attraction morphology	✓
6.	Safe	✓
7.	Cultural link	X

5. Conclusion

This is the first study on ranging behavior of *P. neglectus* in Kampung Johor Lama, although this can be considered as preliminary data. Small ranging area of Schlegel's banded langur throughout Kampung Johor Lama with high number of hours spent on checkpoint A and B shows reliable sighting site for PrimaTourism program to be held in Kampung Johor Lama. Reliable and good sighting, dynamic and arboreal behavior, rarity of population and presence of albino individuals provide excellent standpoint in developing the PrimaTourism program for the conservation measures of the species.

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