Project Update: July 2018

Pig-tailed macaques in oil palm – pest or pest control?

I am grateful that this project has received an extension of its 1-year grant period as the prolonged rainy season end of 2017 had severely impacted and complicated our field research efforts. We are about to finish our study and expect to hand in the final report in early August.

1. Population study of plantation rats

We have now successfully concluded the mark-and recapture study of plantation rats to assess the impact of macaques and/or forest borders on the abundance of *Rattus* sp. in oil palm plantations in Segari, Malaysia. While we are currently preparing more advanced GLMM statistics to assess effects, we have just presented our preliminary results at the 55th Annual Meeting of the Association for Tropical Biology and Conservation from 1st to 5th July 2018 (http://atbc2018.org/).

Our results suggest an impact of macaques on rat abundance as we saw a negative correlation between trapping success and presence frequency of macaques. We are also working on a publication about the rat feeding behaviour in general, and the suggested role of biological pest control in specific.

The baseline data of our study on the behaviour of pig-tailed macaques in oil palm plantations (funded by the 1st Rufford Small Grant) has also just been published in the International Journal of Primatology in March 2018 (https://rdcu.be/KFsd).

Rat feeding behavior of pig-tailed macaques (*Macaca nemestrina*) in oil palm plantations

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1. INTRODUCTION

Malaysia is a biodiversity hotspot with high primate diversity but still loses large parts of its natural habitat to new oil palm plantations [A]. These notably change the composition, availability and distribution of natural food resources for a wide range of tropical forest species, and introduce an anthropogenic food source, which may fuel human-wildlife conflicts. Pig-tailed macaques are one of the primate species affected by the dramatic decline of forest habitat in Malaysia. In fragmented forests, they increasingly divert their foraging activities into oil palm plantations, where farmers generally consider them as crop pests [B].

Contrary to this common belief, we argue that macaques act as biological pest control as we found macaques frequently feeding on plantation rats of the genus *Rattus*.

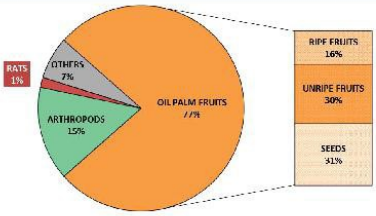
2. METHODS

Study site: Oil palm plantations bordering the South-Western edge of the Segari Melintang Forest Reserve, Perak, Peninsular Malaysia (4°19-20'N, 100°34-36'E).

Duration of study: March 2016 – April 2018.
Study animals: Two groups (40 – 50 individuals each) of wild, habituated Southern pig-tailed macaques (*Macaca nemestrina*).
GPS and focal data recording: We took the GPS location daily during the study period and recorded main activity and food consumed in individual focal observations for a total observation time of 81 hours.
Capture and recapture study on plantation rats: We trapped nine 0.5 ha sized plantation plots, each containing 32 wire mesh life traps, twice for eight consecutive nights. We handled animals according to a standardized protocol and marked them for individual identification. For each plot we calculated the frequency of macaques being observed in the trapping area during six weeks preceding the trapping.

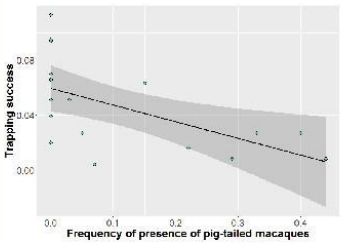
3. RESULTS

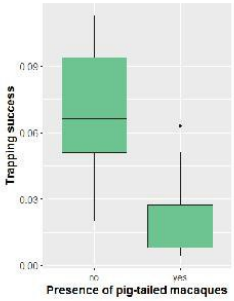
Average daily feeding budget of a group of wild pig-tailed macaques at oil palm plantations.

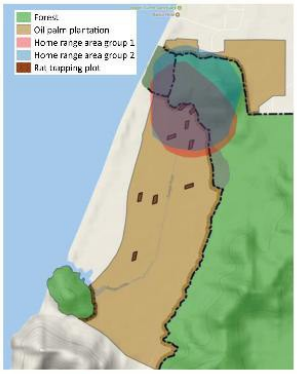


Given the average daily duration of 2.72 hours our study group spent at the plantation and the rates of 0.15 (adult male) and 0.03 (adult female) rats consumed per individual per hour, an average group of macaques (10 adult males, 20 adult females) consumes about 2,085 rats per year.

We used trapping success (TS) as a measure for rat abundance. TS was significantly smaller in trapping plots with present pig-tailed macaques compared to plots without the occurrence of macaques (Wilcoxon test, $p < 0.01$). Further, we found a significant negative correlation between the frequency of present macaques and the trapping success (Spearman's correlation, $R = -0.68$, $p < 0.01$)







4. CONCLUSIONS

Though rats account for only one percent of the macaques' feeding budget at oil palm plantations, they are a high quality food source and provide the macaques with valuable proteins.

Our results indicate a smaller rat abundance in plantation areas with increasing occurrence of pig-tailed macaques and thus support the macaques' role as **biological pest control** in oil palm plantations. This knowledge will help to mitigate the human-wildlife conflict by changing the attitude among farmers, companies and stakeholders toward this species. For the future we aim at a fruitful **collaboration with oil palm stakeholders** to develop techniques for biological pest control.

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LITERATURE:
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[B] Linkie M, Dinata Y, Nofrianto A, LeaderWilliams N. 2007. Patterns and perceptions of wildlife cropraiding in and around Kerinci Seblat National Park. Animal Conservation 10(1): 127-135.

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2. Public engagement, awareness & education

Since March 2017, I have given more than 10 public talks about pig-tailed macaques (see 2nd Rufford update report including new activities at KL and Penang). My team and I have also run several public engagement and booth activities in and around Penang, Kuala Lumpur and in Kuching Sarawak, where we presented our primate projects and related interesting research findings, such as the rat feeding behaviour of the macaques. We have engaged with the general public and representatives from the forestry department and oil palm sector. Our social media page & posts (www.facebok.com/nemestrina) and website receive good visitor numbers and positive feedback.

In order to better pitch the potential role of macaques as biological pest control to relevant stakeholders, we have been creating videos and educational material. On two separate occasions, international film teams from Europe have followed our field research team and study groups for a day to record the interesting behaviour and produce visually attractive and informative short documentaries about our project. Both videos are currently being cut and edited and I will provide a YouTube link, once they are ready. The local National Television Network (RTM) has planned to visit the project in September 2018 to film a 20-minute short documentary about the macaques in oil palm plantations, which will further boost the public awareness about this species in Malaysia.

Our project has also received national and international media coverage. https://www.sciencenews.org/article/malaysia-pig-tail-macaques-eat-rats-head-first

https://www.scihealthnews.com/monkey-learns-to-live-in-oil-palm-plantations-but-forest-is-still- essential/

3. Stakeholder meetings

Meetings with top oil palm companies have further been delayed due to their busy schedules but I have just received the good news that two of Malaysia's largest oil palm companies are now aware of my project and very interested in the findings and wish to further collaborate with me. I will further pursue to establish meetings and workshops with them as soon as possible.