UNIVERSITI PUTRA MALAYSIA

THE GROUP SIZE AND DENSITY OF LONG-TAILED MACAQUE (Macaca fascicularis) (PRIMATES: CERCOPITHECIDAE) IN OIL PALM PRODUCTION LANDSCAPES

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Faculty of Forestry
University Putra Malaysia

2016

THE GROUP SIZE AND DENSITY OF LONG-TAILED MACAQUE (*Macaca fascicularis*) (PRIMATES: CERCOPITHECIDAE) IN OIL PALM PRODUCTION LANDSCAPES

By

TEE SZE LING

A Project Report Submitted in Partial Fulfilment of the Requirement for the Degree of Bachelor of Forestry Science in the Faculty of Forestry University Putra Malaysia

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DEDICATION

To my parents ***Tee Tong Phiak & Tok Ai Lik,***

The reasons of who I become today.

Thanks for your greatest support and unconditional love.

To my friends who willing to accompany me to the field.

The support and encouragement you showed to me.

To all the people that I know,

The support and attention of yours let me have the reason to finish this study.

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ABSTRACT

Expansion of oil palm (*Elaeis guineensis*) industry in Malaysia is one of the major threats that has caused biodiversity loss and fragmentation of forest areas. *Macaca fascicularis* is an example of primate species that being negatively affected by oil palm agriculture but not much attention is being paid to this common species. The effects brought by oil palm monocultural plantations can be explained through understanding the population size of long-tailed macaque in large-scale oil palm plantations. The main objective of this study is to determine the effect of oil palm production on the population of *M. fascicularis*. A census of long-tailed macaque had been conducted between January to February 2016 to determine the mean troop size of macaque in a large-scale oil palm plantation with a total area of 1689.531 hectares. A total number of 13 groups with 98 individuals were recorded. The density of long-tailed macaque within the oil palm plantation area was 5.68 individuals per 100 hectares. One sample *t*-test, two sample *t*-test, and two-sample Poisson test were used to analyze the collected data. The mean group size of long-tailed macaque in large-scale oil palm plantation with that in oil palm smallholdings (t = 4.70), primary forest (t = -7.32), and secondary forest (t = -9.22) had a significant difference ($p < .001$). The comparison between adult abundance and juvenile abundance in large-scale oil palm plantation showed a slightly significant difference (p = .043) with the simple normal approximation of -2.020. The comparison between adult abundance and juvenile abundance in smallholdings was significantly different ($p < .001$). There was a significant difference ($p < .001$) in adult abundance between large-scale oil palm plantation and oil palm smallholdings (t = -6.58). However, there was no significant difference (p = .05) in juvenile abundance between large-scale oil palm plantation and oil palm smallholdings (t = 2.13). The negative impacts brought by oil palm production to long-tailed macaque population are more severe in large-scale plantation than in oil palm smallholdings. Large-scale oil palm monocultures should be minimized or limited as it causes adverse impacts on biodiversity including common species such as long-tailed macaque.

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ABSTRAK

Perkembangan industri kelapa sawit (*Elaeis guineensis*) di Malaysia merupakan salah satu ancaman yang menyebabkan kehilangan biodiversiti dan pemecahan kawasan hutan. *Macaca fascicularis* (kera) merupakan contoh primat yang mengalami kesan negatif dalam isu ini namun spesis biasa ini tidak dapat perhatian daripada mana-mana pihak. Impak yang disebabkan oleh pengamalan monokultur dalam ladang kelapa sawit berskala besar dapat dijelaskan melalui pemahaman terhadap populasi kera. Objektif utama kajian ini adalah untuk mengkaji kesan ladang kelapa sawit berskala besar terhadap populasi kera. Satu bancian telah dijalankan dari Januari hingga Februari 2016 untuk mengkaji saiz kumpulan kera dalam ladang kelapa sawit berskala besar yang mempunyai keluasan 1689.531 hektar. Berdasarkan bancian, sebanyak 13 kumpulan terdiri daripada 98 ekor kera telah direkodkan. Ketumpatan kera dalam kawasan ladang kelapa sawit tersebut ialah 5.68 individu bagi setiap 100 hektar. Kaedah *t*-test satu sampel, *t*-test dua sampel, dan Poisson test dua sample telah digunakan untuk menganalisa data yang telah dikumpulkan. Purata saiz kumpulan kera di ladang kelapa sawit berskala besar dengan yang itu di kebun kelapa sawit berskala kecil (t = 4.70), hutan primer (t = -7.32), dan hutan sekunder (t = -9.22) mempunyai perbezaan yang ketara (p < .001). Perbandingan antara bilangan dewasa dengan juvana di ladang kelapa sawit berskala besar dan di kebun kelapa sawit berskala kecil mempunyai perbezaan ketara yang sedikit (p =.043) dengan penghampiran normal mudah -2.020. Perbandingan antara bilangan dewasa dengan juvana di kebun kelapa sawit berskala kecil mempunyai perbezaan yang ketara (p < .001). Perbezaan yang ketara (p < .001) juga terdapat dalam perbandingan bilangan dewasa antara ladang kelapa sawit berskala besar dengan kebun kelapa sawit berskala kecil (t = -6.58). Namun begitu, perbandingan bilangan juvana antara ladang kelapa sawit dengan kebun kelapa sawit berskala kecil (t = 2.13) tidak mempunyai perbezaan yang ketara (p = .05). Kesan negatif yang dibawa oleh pengeluaran kelapa sawit terhadap populasi kera di ladang kelapa sawit berskala besar lebih teruk daripada di kebun kelapa sawit berskala kecil. Perladangan kelapa sawit monokultur yang berskala besar harus dikurangkan atau dihadkan sebab ia menyebabkan kesan buruk terhadap biodiversiti termasuk spesis biasa seperti kera.

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APPROVAL SHEET

I certify that this research project report entitled "The Group Size and Density of Long-tailed Macaque (*Macaca fascicularis*) (Primates: Cercopithecidae) in Oil Palm Production Landscapes" by Tee Sze Ling has been examined and approved as a partial fulfillment of the requirements for the degree of Bachelor of Forestry Science in the Faculty of Forestry, University Putra Malaysia.

Approved by:

_____

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Date: 23rd June 2016

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CHAPTER 1

INTRODUCTION

1.1 Oil Palm Industries and Current Issues in Malaysia

Malaysia has a total land area of 32.855 million hectares and 20.456 million hectares (62.3%) of forested area (Bahamondez et al., 2010). However, the forest areas are now threatened by land conversion for urban development and agricultural activities which require a large land area. Oil palm agricultural landscapes are one of the major threats among other agricultural activities which have already used up 5.39 million hectares (16.4%) of our land area (Malaysia Palm Oil Board, 2014). The palm oil industry started in Malaysia since the 1870s by the British. The expansion of palm oil industry has not slowed down due to its glorious name, the "Golden Crop" which gives a high monetary return during its 30 years lifespan and only needs 0.26 hectares to produce one tonne of oil. Oil palm requires ten times less land than the other oil seeds crops such as soybean and rapeseed (Richardson, 2010). Small-scale farmers normally choose oil palm as their primary agriculture crop due to short term luring profits. In addition, the use of palm oil in various daily products has made us become more rely on it.

Tropical rainforests are home to diverse flora and fauna species yet now the habitat loss and isolation issues are exerting negative impacts on wildlife (Anderson et al., 2007; Koh & Wilcove, 2008; Bernard et al., 2009; Wilcove & Koh, 2010). Primate species such as the ape group (gibbon, siamang, orangutan, chimpanzee, bonobo and gorilla) and the monkey group

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(macaque, baboon, langur, and guenon) are the examples of the mammals that are being negatively affected by forest fragmentation. Since oil palm becomes dominant crop in producing countries, increasing plantations area has caused many of protected forest reserves are now being surrounded by oil palm agriculture. In Malaysia and Indonesia, both Bornean and Sumatran orangutan species are losing their natural habitat due to the forest conversion into oil palm plantations (Nellemann et al., 2007; Meijaard & Sheil, 2013).

Unfortunately, there is no detailed information about the status of primates particularly in oil palm production landscapes regarding their health status, genetic variations, and population size. Past studies have shown that oil palm provides a complementary habitat for the arboreal species as it has a high canopy and provides food sources for non-human primates that are inhabiting the forest agriculture ecotone (Riley, 2007). However, there is still a lack of actual evidence on the real interactions between the environment and primate species in oil palm production landscapes.

In the case where some primates show remarkable ecological and behavioral flexibility in response to their changing environment (Anderson et al., 2007), *Macaca fascicularis* (commonly known as long-tailed or crab-eating macaque) has become one of the most successful examples. This species is well-known by its high adaptability of thriving in diverse habitats distinctly disturbed areas such as forest edges and human-inhabited areas (Gumert, 2011). *M. fascicularis* is one of the most widely spread monkeys throughout Southeast Asia (Wheatley, 1978). In Malaysia, it can be found in primary

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forest, secondary forest, mangrove swamps areas, and urban areas (Richard et al., 1989).

Scientists have little concern about this species because this species always occurs in a large group size. However in the present study, the interactions between *M. fascicularis* and oil palm production landscapes will become a crucial turning point on the ignorant public's perceptions regarding the population of *M. fascicularis* in Malaysia. The relative biodiversity values of large-scale oil palm plantations should be evaluated to determine the ecological impacts brought by land use modifications (Koh & Wilcove, 2008).

1.2 Problem Statement

Land conversion is causing some wildlife to migrate into fragmented and low-quality areas. Sometimes it is even forcing them to modify their natural behaviors to survive. Oil palm industry has become one of the biggest drivers that advanced development of land use with unknown biodiversity loss. Although some research has been carried out on the status of birds, amphibians, reptiles, and rodents in oil palm production landscapes, yet far too little attention has been given to primate species especially the monkey groups which often found wandering around the plantations (Lee, 2008; Azhar et al., 2011; Gillespie et al., 2012; Azhar et al., 2014; Gallmetzer & Schulze, 2015; Teuscher et al., 2015). *M. fascicularis* is one of the affected primate species which is originally found in riverine and forested areas yet now with unknown status in monocultural oil palm plantations.

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In this study, *M. fascicularis* is studied because of the low interest among researchers as too much of negative perceptions including as a pest to agriculture activities and caused damage and harassment to the public. Lots of management control plans such as culling, translocation, and sterilization have been taken in urban or rural areas to suppress the rage of public towards them. The action of making *M. fascicularis* disappearing instead of taking the initiative to understand and survey their population is only scratching the surface of the problem. Limited past studies have led to insufficient of baseline data that can determine whether they are overpopulated or not. Hence, understanding the troop size of long-tailed macaque in oil palm production landscapes is very crucial in determining the ecological impacts brought by monocultural oil palm plantations towards the ecosystem.

1.3 Objectives

This study is conducted to determine the effects of forest conversion into oil palm agriculture on *M. fascicularis* population. The specific objectives of this study are:

I. To determine the mean troop size of *M. fascicularis* in a large-scale oil palm plantation;

II. To compare the number of adult and juvenile *M. fascicularis* in a large-scale oil palm plantation; and

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III. To contrast the mean troop size of *M. fascicularis* between large-scale oil palm plantation, oil palm smallholdings, primary forest, and secondary forest.

In this case, studying group size and density of *M. fascicularis* is crucial in implementing more effective surveys and monitoring programs. It also provides the empirical data for the evaluation of existing conservation and management strategies.

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