



UNIVERSITI PUTRA MALAYSIA

**MAMMAL ABUNDANCE AND DIVERSITY IN OIL PALM
CULTIVATIONS IN PENINSULAR MALAYSIA**

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**MAMMAL ABUNDANCE AND DIVERSITY IN OIL PALM
CULTIVATIONS IN PENINSULAR MALAYSIA**

By

NOR LAILI IBRAHIM

**Thesis Submitted to the School of Graduate Studies, Universiti
Putra Malaysia, in Fulfillment of the Requirement for the
Degree of Master Science**

April 2012

The logo of Universiti Putra Malaysia (UPM) is centered in the background. It features a shield with a red and white design, including a book and a torch. The letters 'UPM' are prominently displayed in red at the top of the shield.

Dedication

This piece of work is dedicated to my dearest father Ibrahim

Awang and mother Laiton Abd. Rahman and to all my

siblings Kak Na, Kak Ma, Annie, Abang G, Pia H,

Sarah, Amirul and Aliff

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in
fulfilment of the requirement for the degree of Master of Science

**MAMMAL ABUNDANCE AND DIVERSITY IN OIL PALM
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April 2012

Chair : Ebil Yusof, PhD

Faculty : Forestry

Currently, oil palm is one of the world's leading crops with rapidly increasing demand but it lead to conservation issues like tropical deforestation and biodiversity. As such values are likely to be one of the major conservation issues across the globe. Therefore, conservation efforts for these threatened and endangered species, especially terrestrial mammal often suffer due to a lack of information on species requirements or their distribution. Nowadays, terrestrial mammals are not only confined to nature reserves and protected area, but also becoming widespread in other land uses as well as within oil palm landscape.

To date, there are few scientific studies that have investigated fauna biodiversity on oil palm-dominated areas, particularly big mammals. The aim of the study is to quantify mammal abundance and diversity in oil palm plantation estates and smallholdings in Peninsular Malaysia. More specific, it is to estimate the species based on sighting number in the study area; to determine the patterns of mammals in the selected areas in context of conflict by human-wildlife, and to investigate the relationships of species richness between the characteristic of management systems and landscape level effects.

This study was conducted at the oil palm plantation in the districts of the states in Selangor, Negeri Sembilan, and Pahang. A total of 42 study sites were selected with 33 sites being represented by large scale oil palm plantations and 19 sites from the smallholdings cultivations. The study used the Local Ecological Knowledge as its main method, one which was inexpensive to collect data on mammal species. The data collection was done through interviewing respondents about the occurrence and abundance of medium to large-sized forest mammals, and followed with an observation through transect survey for small mammals that were sighted in oil palm-dominated areas.

A total of 421 respondents completed the interviews, including those who have worked in plantation estates and smallholdings. The study

managed to record a total of 18,052 individual animals from 40 species including seven most endangered species. Among them, the primate species was the most commonly registered mammals, with the Malayan Sun Bear being frequently present, thus showing significantly higher numbers in smallholdings than in plantation estates ($p < 0.05$) at standing age of oil palm more than 20 years.

Oil palm management plays an important role in the influence of mammal diversity and abundance. It is noticed that the smallholdings were planted with different crops. As a result, this specific practice may have directly or indirectly improved the complexity of plant richness and habitat which benefited some mammal species.

In conclusion, this study has been able to demonstrate that most of the oil palm areas can support some native mammals, if hunting and conflict in human-wildlife problem can be overcome by plantation stakeholders. Apart from forest conservation, the studies have also recommended that the oil palm-dominated areas be managed more as an off-reserve strategy in order to protect the mammal diversity.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Sarjana Sains

**KELIMPAHAN MAMALIA DAN KEPELBAGAIANYA DALAM
PENANAMAN SAWIT DI SEMENANJUNG MALAYSIA**

Oleh

NOR LAILI IBRAHIM

April 2012

Pengerusi : Ebil Yusof, PhD

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Pada masa ini, sawit adalah salah satu tanaman utama dunia dengan permintaan yang semakin meningkat dan pesat tetapi ia membawa kepada isu-isu pemuliharaan seperti penebangan hutan tropika dan biodiversiti. Ini kerana nilai-nilai itu berkemungkinan menjadi salah satu isu-isu pemuliharaan utama di seluruh dunia. Oleh itu, usaha-usaha pemuliharaan spesies terancam dan yang diancam kepupusan ini, terutamanya mamalia daratan seringkali mengalami gangguan berikutan kekurangan maklumat mengenai kehendak spesies atau taburan mereka. Pada masa kini, mamalia daratan tidak hanya tertumpu kepada rizab alam semula jadi dan kawasan perlindungan, malah ia juga semakin meluas dalam penggunaan tanah serta landskap tanaman sawit yang lain.

Sehingga kini, terdapat beberapa kajian saintifik yang telah diselidiki biodiversiti fauna ke atas kawasan yang dikuasai-tanaman sawit, khususnya mamalia besar. Tujuan kajian ini adalah untuk mengukur kelimpahan mamalia dan kepelbagaian di ladang-ladang tanaman sawit dan pekebunan kecil di Semenanjung Malaysia. Secara spesifik lagi, ia adalah untuk menganggarkan spesies yang dijumpai berdasarkan keatas bilangan individu di kawasan kajian; untuk menentukan corak mamalia di kawasan-kawasan terpilih dalam konteks konflik antara manusia-hidupan liar, dan untuk menyiasat hubungan kekayaan spesies diantara ciri-ciri pengurusan sistem dan kesan-kesan tahap landskap.

Kajian ini telah dijalankan di ladang tanaman sawit di daerah-daerah negeri di Selangor, Negeri Sembilan, dan Pahang. Sebanyak 42 tapak kajian telah dipilih dengan 33 tapak yang diwakili oleh ladang tanaman sawit yang besar dan 19 tapak dari tanaman pekebunan kecil. Kajian ini telah menggunakan Pengetahuan Ekologi Tempatan sebagai kaedah utama, salah satu kaedah yang murah untuk mengumpulan data mengenai spesis-spesies mamalia. Pengumpulan data telah dilakukan melalui menemuramah responden mengenai kejadian dan kelimpahan mamalia hutan bersaiz sederhana hingga ke besar, dan diikuti dengan pemerhatian melalui kajian transek untuk mamalia kecil yang telah dilihat dalam kawasan yang didominasi tanaman sawit.

Sebanyak 421 responden telah menyempurnakan temuramah, termasuk mereka yang telah bekerja di estet perladangan dan pekebunan kecil. Kajian ini berjaya mencatatkan sejumlah 18,052 individu binatang daripada 40 spesies termasuk tujuh spesies yang diancam kepupusan. Antara mereka, spesies primat adalah mamalia yang paling biasa didaftarkan, dengan Beruang Matahari yang kerap hadir dikawasan berkenaan, sekali gus menunjukkan bilangan yang ketara dalam pekebunan kecil lebih tinggi daripada di estet perladangan ($p < 0.05$) pada umur dirian tanaman sawit melebihi daripada 20 tahun.

Pengurusan tanaman sawit memainkan peranan yang penting dalam mempengaruhi kepelbagaian mamalia dan kelimpahannya. Menyedari bahawa pekebunan kecil ini telah menanam dengan tanaman yang berbeza dalam tanaman sawit mereka. Sebagai hasilnya, ia merupakan praktis yang spesifik berkemungkinan secara langsung atau tidak langsung telah meningkatkan kekompleksan kekayaan tumbuhan dan habitat yang memberi manfaat terhadap beberapa spesies mamalia.

Sebagai kesimpulan, kajian ini telah menunjukkan bahawa kebanyakan kawasan tanaman sawit boleh menyokong beberapa mamalia asli, seandainya pemburuan dan masalah konflik dalaman antara manusia-hidupan liar boleh diatasi oleh pihak yang berkepentingan. Selain daripada pemuliharaan hutan, kajian juga telah mencadangkan bahawa

kawasan-kawasan yang didominasi-tanaman sawit dapat diuruskan dengan lebih baik sebagai salah satu strategi rezab-luaran untuk melindungi kepelbagaian mamalia.



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I certify that an Examination Committee has met on **9 April 2012** to conduct the final examination of **Nor Laili Ibrahim** on her **Master of Science** thesis entitled **“Quantifying Mammal Abundance and Diversity within Oil Palm Cultivations in Peninsular Malaysia”** in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the student be awarded the Master of Science.

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DECLARATION

I declare that the thesis is my original work except for quotation and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or any at any other institution.



NOR LAILI IBRAHIM

Date: 9 APRIL 2012

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