

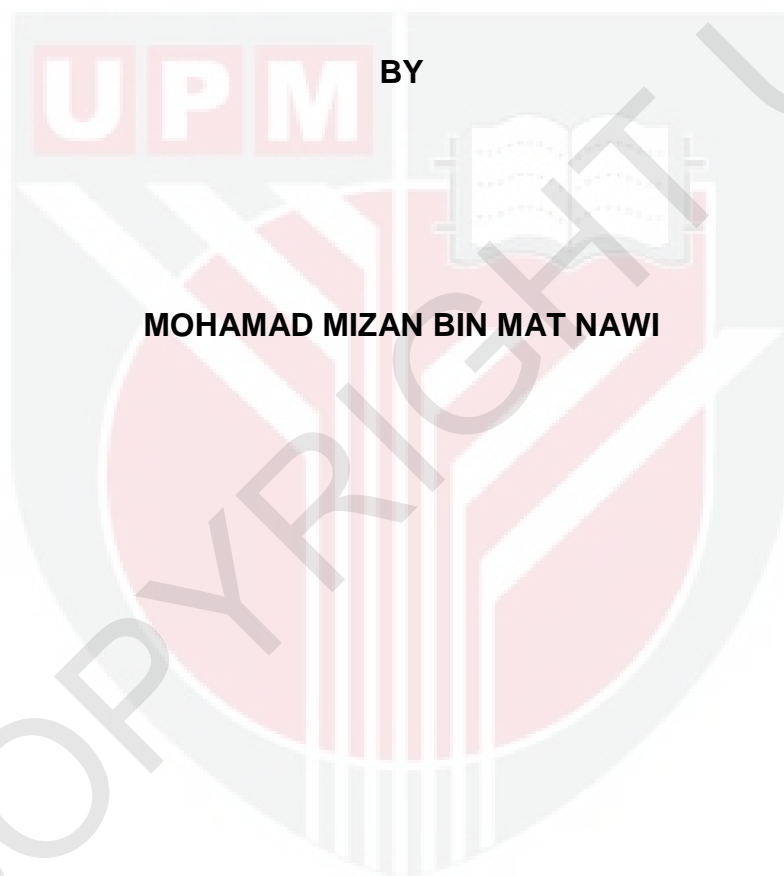


***EFFECT OF HABITAT TYPES, VEGETATION STRUCTURE, AND
PROXIMITY TO FOREST ON INSECTIVOROUS AND NON-
INSECTIVOROUS BIRD ABUNDANCE***

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FH 2019 38

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**A Project Report Submitted in Partial Fulfillment of the Requirements
for the Degree of Bachelor of Forestry Science in the
Faculty of Forestry Universiti Putra Malaysia**

2019

DEDICATION

Thank you and Praise to Allah S.W.T for giving me the good health condition to finish this study.

This thesis is dedicated to:

My Parents,

Mat Nawi Bin Harun and Maimunah Binti Isa

My Siblings,

Nazilah Binti Mat nawi, Naz Edayu Binti Mat Nawi and Nurul Shuhaine Binti Mat Nawi

My Research Team,

Lljan John Anak Ahmui, Intan Farha Shamim Binti Kamaruzzaman, Nurul Iffah Nadhirah Binti Azlan, Nor Afifah Binti Yahya and Sathiyarubini a/p Satimurty

My Supportive Supervisor,

Dr. Badrul Azhar Md Sharif

ABSTRACT

Clearance of tropical forest for agricultural purposes is generally assumed to seriously threaten the survival of birds. In this study, bird species composition, stand level, and landscape level were quantified in three degraded habitat types in Peninsular Malaysia, namely a fruit orchard, rubber tree plantation, and oil palm plantation. The aim of this research was to investigate the effect of habitat types, vegetation structure and proximity to the forest on insectivorous and non-insectivorous bird abundant. 240 points of mist-netting were installed in a fruit orchard, rubber tree plantation, and oil palm plantation. 80 points of mist-netting for each habitat type. There were ten variables used in this study, canopy cover, ground vegetation cover, tree height, tree density, understory vegetation, light intensity, altitude, habitat type, proximity to the forest, and month. A total of 180 birds from 37 species were found in tropical agriculture landscapes. For the insectivorous bird, a total of 86 birds from 18 species were captured while for the non-insectivorous bird, a total of 94 birds were captured. The result shows that from 10 variables used, only four variables were significant for insectivorous (canopy cover, proximity to forest, habitat type and month) and non-insectivorous birds (understory vegetation, tree density, habitat type and month). Further research is required to understand more about the factors of habitat quality that influence the species composition and the benefit that birds can provide to humans such as pollination, natural predator and decomposition.

ABSTRAK

Penebangan hutan tropika untuk tujuan pertanian umumnya dianggap serius mengancam kelangsungan hidup burung. Dalam kajian ini, komposisi spesies burung, tahap pendirian dan paras lanskap telah diukur dalam tiga jenis habitat yang terdegradasi di Semenanjung Malaysia, iaitu kebun buah, tanaman pokok getah dan ladang kelapa sawit. Tujuan penyelidikan ini adalah untuk mengkaji kesan jenis habitat, struktur tumbuh-tumbuhan dan jarak hutan ke atas burung yang memakan serangga dan bukan yang memakan serangga. Sebanyak 240 jaring telah dipasang di kebun buah, ladang pokok getah, dan ladang kelapa sawit. 80 jaring telah dipasang untuk setiap jenis habitat. Terdapat 10 pembolehubah yang digunakan dalam kajian ini, perlindungan kanopi, perlindungan tumbuhan tanah, ketinggian pokok, ketumpatan pokok, tumbuhan understory, intensiti cahaya, ketinggian, jenis habitat, jarak dekat dengan hutan, dan bulan. Sebanyak 180 ekor burung daripada 37 spesies ditemui di landskap pertanian tropika. Bagi burung pemakan serangga sejumlah 86 ekor burung dari 18 spesies ditangkap manakala bagi burung bukan pemakan serangga, sejumlah 94 ekor burung ditangkap. Hasil kajian menunjukkan bahawa dari 10 pembolehubah yang digunakan, hanya empat pembolehubah yang penting untuk insektivorous (perlindungan kanopi, jarak hutan, jenis habitat dan bulan) dan burung bukan insektivorous (vegetative understory, kepadatan pokok, jenis habitat dan bulan). Kajian lanjut diperlukan untuk memahami lebih lanjut mengenai faktor-faktor kualiti habitat yang mempengaruhi komposisi spesies dan faedah yang dapat diberikan burung kepada manusia seperti pendebungaan, predator semula jadi dan penguraian.

ACKNOWLEDGMENTS

All praise to Allah Most Gracious, Most Merciful, Who, Alone, bring forgiveness and light and new life to those who call upon Him: and to Him is the dedication of this research paper.

First and foremost, I am grateful to my beloved parents and family for their countless support and love in my life. I would also like to express my sincere gratitude to my supervisor, Dr. Badrul Azhar Md Sharif for his hour of reflecting, reading, encouraging, and most of all patients throughout the entire project.

I also thank my examiners, Dr. Puan Chong Leong and Prof. Dr. Mohamed Zakaria Bin Hussin for their guidance, constructive criticisms, and advice to make this project a better one.

I would like to acknowledge and thank my wildlife team who stand by me, for all kindness full of untiring effort throughout the project. Last but not least, special thanks to the people involved directly and indirectly in providing any assistance requested in this final year project.

APPROVAL SHEET

I certify that this research project report entitled "Effect of Habitat Types, Vegetation Structure and Proximity to Forest on Insectivorous And Non-Insectivorous Bird Abundance" by Mohamad Mizan Bin Mat Nawi has been examined and approved as partial fulfillment of the requirement for the degree of Bachelor Of Forestry Science in the Faculty Of Forestry, Universiti Putra Malaysia.

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CHAPTER 1

INTRODUCTION

1.1 General Background

Habitat loss and degradation of tropical forests is a significant issue at global, national and local scales. The tropical rainforest is well known for its biodiversity and rich in wildlife. However, many of this forest has been widely exploited and cleared for timber and other land use such as for agriculture purpose for over the last century. Peh et al (2006) stated that the clearance of tropical forest for agriculture purpose gives a serious threat to forest bird species. In long-term survival, many forest birds will depend mainly upon their ability to persist in human-altered habitat (Zakaria et al., 2005).

Malaysia is one of the developing tropical countries where both proximate and underlying causes of land use play the most significant role in promoting forest fragmentation. There are three significant agricultural landscapes in Malaysia which are oil palm (*Elaeis guineensis*) plantation, rubber tree plantation (*Hevea brasiliensis*) and fruit orchard. In Malaysia, the development of oil palm and rubber is one of the main causes of forest loss (Abdullah and Nakagoshi, 2008). Fruit orchard usually planted by a villager and there is around 375000 ha of land in Malaysia (DOA, 2008).

There are two types of systems practised in agricultural landscapes; the modern system and traditional system. The modern system is very successful in meeting a growing demand for food by the world's population. Yields of primary crops such as rice and wheat increased dramatically, the price of food declined, the rate of increase in crop yields generally kept pace with population growth, and the number of people who consistently go hungry was slightly reduced. However, changes in agricultural practices and the increasing use of modern intensive agriculture techniques have had a direct negative impact on biodiversity at all levels: ecosystem, species, and genes (McNeely et al., 1995).

Traditional agriculture is based on treating the soil and plants with products that are more likely not lethal, and more likely than not synthetically produced in a laboratory. These products are used to prevent disease or pest from blighting the plant. These traditional agro-ecosystems are receiving gaining attention in studies dealing with the conservation of biodiversity (Pimentel et al., 1992; Greenberg et al., 1997; Thiollay, 1998).

There is a large scale of work that examined the interaction between bird and agriculture. Birds are popular and charismatic organisms, attracting much public interest. This is well illustrated by the vast array not only of amateur ornithologists but also of governmental, non-governmental and academic organizations, with a particular interest in birds. Their diversity provides valuable comparisons of

processes affecting ecologically similar or contrasting species, (Bradbury et al. 2000; Brickle et al. 2000). More importantly, concerning to the agricultural issue, their patterns of behaviour, distribution, seasonal phenology and demography track closely onto the spatial and temporal scales of agricultural change. Foraging, nest-site selection or breeding performance reflect features within the patchwork of agricultural habitats (Bradbury et al. 2000; Brickle et al. 2000). The pattern of events in the annual farming calendar interacts with crucial events in their own lives such as breeding or migration bird (Pettygrove & Eadie 2000; Chamberlain et al. 2000). Their populations or communities are different in ways that reflect local, regional or international variations in land use or management (Manel, Buckton & Ormerod 2000; Milsom et al. 2000).

1.2 Problem Statement

Agriculture remains an important sector of Malaysia's economy, contributing 12 percent to the national GDP and providing employment for 16 percent of the population. However, according to World Wildlife Foundation Malaysia (2015) stated that our forest wetlands and other habitats continue to disappear, degrade and fragment as they are cleared to make way for agriculture, housing, roads, pipelines and the other hallmarks of industrial development. Some studies have been done to study farmland biodiversity in Malaysia. Farmers in Malaysia do not understand the importance of biodiversity to agriculture. These include benefits such as ecosystem service (e.g. pollination, natural predator, decomposition) and sustainability certification. The purpose of this study is to investigate the effect on habitat types, vegetation structure and proximity to the forest on insectivorous and non-insectivorous bird abundant in three different agricultural landscape such as oil palm plantation, rubber plantation and fruit orchard. The findings from this study can be used to improve knowledge about the benefit of bird in agricultural and can be used to improve the biodiversity conservation in an agricultural landscape.

1.3 Aim and Objective

The study aims to investigate the effect on habitat types, vegetation structure and proximity to the forest on insectivorous and non-insectivorous bird abundances.

The following are the objectives of the study:

- I. To determine bird abundance at three different habitats i.e. oil palm, rubber and orchard.
- II. To examine stand/ad hoc- and landscape-level factor at three different agriculture habitats.
- III. To examine the relationship between bird abundance (insectivorous/non-insectivorous) and stand-/landscape-level factors.

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