UNIVERSITI PUTRA MALAYSIA

BIRD ABUNDANCE AND HABITAT QUALITY IN A MONOCULTURE OIL PALM PLANTATION

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FH 2016 68

BIRD ABUNDANCE AND HABITAT QUALITY IN A MONOCULTURE OIL PALM PLANTATION

By

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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 University Putra Malaysia

2016

DEDICATION

This study is dedicated to my parents Mohamad Zulzurin Bin Chik and Fazilah bt Abdul Hamid and my closest friend, Mohamad Ikhwan Afifi bin Zulkarnain. Thank you for all the support throughout this study.

ABSTRACT

Forest biodiversity in the tropics is now experiencing dramatic landscape changes due to the expansion of oil palm plantation which is caused by the pressure from economic growth and increasing population. This paper describes how the vegetation, structural complexity and weeding practice affect bird abundance in an oil palm plantation. The main objective of this study was to examine which habitat quality parameters influence bird abundance the most in an oil palm plantation. The study was conducted in the 54 ha UPM oil palm plantation where a total of 20 point count stations were established in three types of oil palm plantation (immature, mature and old) plantation. A total of 1023 individual from 21 species of birds were recorded throughout the study. This study revealed that bird abundance was influenced by canopy cover, followed by age of oil palm stands, treatment (weeding), height of oil palm, season (wet/dry) and also the non grass height. However grass and non grass cover and grass height had no significant effects on bird abundance. The bird abundance increases as the canopy cover decreases. The increase in oil palm age and height leads to an increase in bird abundance. In addition, the presence of weeding activity and wet season cause bird abundance to decrease. Overall, these significant parameters play important role as the key habitat qualities that influence bird abundance in a monoculture oil palm plantation.

ABSTRAK

Biodiversiti hutan di kawasan tropika kini mengalami perubahan landskap dramatik disebabkan oleh peningkatan bilangan ladang kelapa sawit yang dipacu oleh tekanan dari pertumbuhan ekonomi dan peningkatan penduduk. Kertas kerja ini memerihalkan bagaimana tumbuh-tumbuhan, kepelbagaian struktur, dan aktiviti meracun boleh menjejaskan bilangan burung mengikut spesis dalam ladang kelapa sawit berdasarkan parameter – parameter kualiti habitat yang telah dipilih. Objektif utama kajian ini adalah untuk mengkaji parameter habitat kualiti yang manakah yang mempengaruhi bilangan burung mengikut spesis sebuah ladang kelapa sawit. Kajian ini telah dijalankan di kawasan ladang kelapa sawit seluas 54 ha di UPM di mana sebanyak 20 stesen kiraan dijalankan di tiga jenis ladang kelapa sawit, iaitu (tidak matang, matang dan tua). Sebanyak 1023 individu dan 21 spesis burung telah direkodkan. Kajian ini mendedahkan bahawa bilangan burung mengikut spesis adalah dipengaruhi oleh litupan kanopi, diikuti dengan umur dirian kelapa sawit, rawatan (meracun), tinggi kelapa sawit, musim (basah/kering) dan juga ketinggian tumbuhan bukan rumput di bawah kanopi kelapa sawit. Selain itu,litupan tumbuhan rumput dan bukan rumput, dan ketinggian rumput tidak menjejaskan bilangan burung mengikut spesis. Aktiviti meracun dan musim basah menyebabkan bilangan burung mengikut spesis berkurang. Parameter-parameter yang signifikan ini merupakan elemen elemen kualiti habitat yang mempengaruhi bilangan burung mengikut spesis di dalam sesebuah ladang kelapa sawit monokultur.

ACKNOWLEDGEMENTS

In the name of Allah S.W.T., the Most Gracious and the Most Merciful. Alhamdulillah, all praises to Allah S.W.T. for the strength and His blessing for me in completing this study. Special appreciation goes to my Supervisory Committee, Dr. Badrul Azhar Md. Sharif for his supervision and constant support. His invaluable help and of constructive comments and suggestions throughout the experimental and thesis works have contributed to the success of this research.

Sincere thank to my friends Tee Sze ling, Setia Majuri, Nur Safwana Sairan, Nur Razanah Ahmad, Ikhwan Afifi Zulkarnain and Syafiq for their kindness and help in this study. My deepest gratitude goes to my parents Mohamad Zulzurin Bin Chik and Fazilah bt Abdul Hamid and to my siblings Muhammad Affandy, Muhammad Asslam, Siti Safuraa and Muhammad Azim for their endless love and prayers to me. I Love all of you.

APPROVAL SHEET

I certify that this research project report entitled **"**Bird Abundance and Habitat Quality in a Monoculture Oil Palm Plantation" by Siti Aisyah Bt Mohamad Zulzurin has been examined and approved as a partial fulfilment of the requirements for the Degree of Bachelor of Forestry Science in the Faculty of Forestry, Universiti Putra Malaysia.

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LIST OF ABBREVIATIONS

FAO	Food and Agriculture Organization
NGO	Non Government Organization
RSPO	Roundtable Sustainable Palm Oil
TO	Terrestrial Omnivore
TC	Terrestrial Carnivore
ASI	Arboreal Sallying Insectivore
AO	Arboreal Omnivore
DR	Diurnal Raptor
TGI	Terrestrial Gleaning Insectivore
AGI	Arboreal Gleaning Insectivore
TF	Terrestrial Frugivore
TSI	Terrestrial Sallying Insectivore
GH	Grass Height
HOP	Height of Oil Palm
NGH	Non Grass Height

CHAPTER 1

INTRODUCTION

1.1 Oil Palm in Malaysia

Oil palm can be cultivated in Malaysia since it is a tropical palm tree. The oil palm tree in Malaysia is originated from West of Africa, where it grows wildly and later developed into an agricultural crop. According to an estimation made by (United States Department of Agriculture, 2015), Indonesia is now leading the in palm oil production at 33,000 metric ton followed by Malaysia and Thailand at 20,500 metric ton and 2,200 metric ton respectively. A study by Sumathi et al., (2007) states that 1 ha of oil palm are able to produce 10 times more oil than any other oil seed plantation where the production for 1 ha per year can rise to 3.68 tonnes of oil. The wide variety of uses of palm oil is the main reason why it is an important agricultural crop for the countries in the tropics especially Southeast Asia.

Southeast Asia forest has been replaced with oil palm plantation as it considered as the crop that experiences dramatic increase in a short time (Fitzherbert, 2008). It is also stated in the study that oil palm landscapes is the poorest habitat for biodiversity in tropical region. About 80% out of the world palm oil comes from the two major palm oil producers which are Malaysia and Indonesia and at the same time, these two countries holds 80% of the primary forest left in Southeast Asia. Indonesia with 4.1 million ha, followed by Malaysia with 3.6 million ha of oil palm plantation (FAO, 2007).

These facts are a major conservation concern because referring to Koh et al. (2008), Indonesia and Malaysia are the two countries with high number of endemic and forest dwelling faunas. Referring to study by Donald (2004), wildlife habitat is particularly poor in oil palm plantations and only able to provide low environmental compensation for the loss of forest areas. Between the year of 1990 and 2005, it was estimated that more than half of the expansion of oil palm area occurred on the tropical forest land (Koh & Wilcove, 2008; Wilcove & Koh, 2010; Teuscher et al., 2014). However, due to high profitability and increase in global demand on this crude oil, oil palm business seems to expand and continue growing for many years ahead (Laurence et al., 2009).

The oil palm production in Malaysia are managed four which are the smaller independent estates, independent smallholders, government smallholder settler schemes and the managed by publicly listed companies. Countries with growing economy like China and India demanded high amount of palm oil products thus encouraging more oil palm plantation area to be established. China and India imported a total of 6141,987 tonnes which is 35 % of total Malaysia exports (Malaysia Palm Oil Board, 2013). However, the oil palm management regimes can be improved through accepting the establishment of oil palm cultivation and looking for the method to manage oil palm plantation for biodiversity conservation outcome.

The expansion of oil palm plantation in Southeast Asia is giving a red alert and grabs major attention from the environmental NGO's. Birds are chosen

in many biodiversity loss study or research due to its well known dependency in native forest habitats (forest specialist an d habitat generalists) and also their dependency on specific food resources such as the frugivores and insectivores. The studies by Azhar et al., (2013) and Edwards et al., (2013) indicate that bird diversity decreases from unlogged forest to logged forest to oil palm. However, the scenario will be different depending on the management regimes (Koh,2008; Azhar et al., 2011; Teuscher et al., 2015).

1.2 Justification Of The Study

The purpose of this study was to determine the key habitat quality that influences bird abundance in an oil palm plantation. This is because, most of the previous studies are more to comparative type of study instead of finding the relationship between habitat quality and to what degree of association does a habitat quality has to relate with bird abundance in an oil palm plantation.

1.3 Problem Statement

The impoverishment of Southeast Asian forest due to the expansion of oil palm plantation has become a major topic to be given attention to. The widening of oil palm plantation area throughout the tropical region has become the biggest current threat to biodiversity (Green et al., 2005). According to study by Aikanathan et al., (2011) palm oil production causes damage to natural environment and the effect of this damage to the

environment is irreversible. Based on the study, it is stated that the impacts of deforestation also includes the habitat loss of critically endangered species. All animals have their own conservation value since they have their own role or niche that helps to balance the ecosystem.

Generally, the natural forest habitat is more complex compared to oil palm monoculture plantation. Natural forest is the best place for these animals since it owns a stable microclimate, less human disturbance, variety age structures, compared to oil palm monoculture plantation (Corley and Tinker, 2003). (Yaap et al., 2009) oil palm plantation usually hold only 15 % of the forest species and the remaining 85% were considered lost during the land conversion. The affected species are vertebrate group especially small mammals, bats, primates, reptiles, carnivores and birds.

According to (Lam et al., 2009; Koh et al., 2010), the impoverishment of wildlife from this land conversion had attracted environmental NGO's especially from outside Southeast Asia region who decided to go against the oil palm plantation. This anti oil palm campaign has affected the economy of the country and also the local socio- economy. RSPO (Roundtable Sustainable Oil Palm) is a non profit organization that had certified that Malaysian palm oil are produced in a sustainable way (Laurance et al., 2010) However, referring to Donald (2004), the certification by RSPO is inadequate to convince the protestors since there are less study supporting the scheme certification.

This study focused on the key factors of habitat quality which are significantly associating with bird abundance in oil palm plantations. There is a need to study bird ecology, focusing on the interaction between bird abundance and habitat quality since past studies have been contradictory in whether the abundance and diversity of a species is positively correlated with habitat quality. In an oil palm plantation, habitat quality is closely associated with oil palm farming practice.

There is a difference in terms of the types of herbicide and pesticide used, how often these pesticides are being applied, clear cut practice or non clear cut practice which will affect the bird abundance in a palm oil plantation due to its close relation with habitat quality and the sensitiveness to habitat change. The examples of habitat quality that can be measured are the ground vegetation cover, presence of epiphyte and height. It is essential to manage the oil palm plantation for conservation outcomes since biodiversity has taken place on the palm plantation due to rapid expansion of this crop. This crop has taken place on an area that was once a forested area.

The expected outcomes include determining the key factor which is closely associated with bird abundance in a palm oil plantation. By knowing the key factor which is most correlated with bird abundance, we are able to enhance the bird community in a palm oil plantation. It is crucial to protect the biodiversity in the oil palm plantation since this crop is now expanding very fast, replacing the forest cover. Moreover, it is also crucial to make the

readily existing oil palm plantation a more wildlife friendly area since the population are now increasing and more land will be cleared.

Plantation managers have to work together in order to manage wildlife, especially on bird species in the palm oil plantation effectively. This should be conducted without undermining the significant contribution to the national economy and social development. However, it is important to realize that it is more important to protect the forest than replacing it with oil palm plantation even though there is a need to boost the economy because animal's right and welfare need to be protected.

1.4 Objectives

The main objective of this study is to determine the key factors of habitat quality which are closely associated and correlated with the bird abundance in a palm oil plantation. This study focused on specific objectives which are:

I) To develop a checklist of bird species in terms of species, family and feeding guild (diet group) in oil palm plantation.

II) To determine the relative bird abundance (mean number of birds per site) in a palm oil plantation.

III) To examine the association between parameters of the habitat quality and bird abundance.

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