

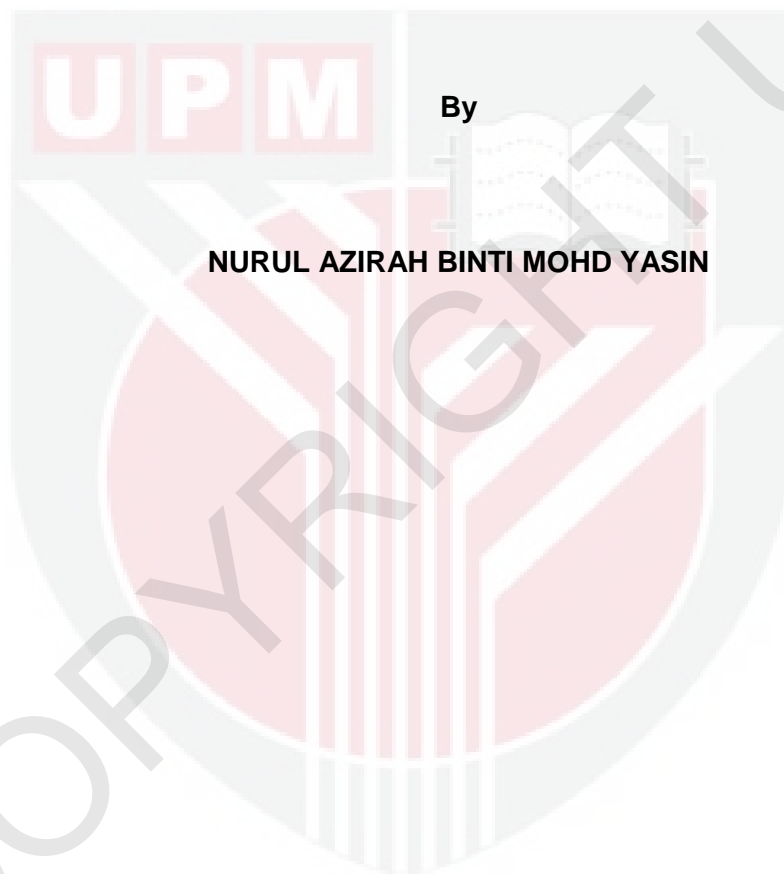


EFFECTS OF FOREST PATCH ISOLATION ON BIRD DIVERSITY

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**A Project Report Submitted in Partial Fulfillment of the Requirements
for the Degree of Bachelor of Forestry Science in the
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DEDICATION

For my beloved family:

Mohd Yasin Bin Mohd Tahir

Rohani Binti Janed

For my siblings:

Mohd Najib Bin Mohd Yasin

Mohd Nizam Bin Mohd Yasin

Muhammad Nazir Bin Mohd Yasin

To all my friends,

Thank you for your encouragements supports

And the sacrifice that you have given

Thank you for everything.

May Allah bless all of us.

ABSTRACT

Forest fragmentation is known as forest patch, which is the breaking of large, contiguous, forested areas into smaller pieces. It is separated by roads, agriculture, man-made corridors, subdivisions, or other human development. Isolated populations in fragmented forest landscapes depend on immigrant individuals that travel from the contiguous forest. This study examined the relationship between birds and habitat in isolated forest at four sites, which are Sungai Lalang Forest Reserve (SLFR), Bangi Forest Reserve (BFR), Ayer Hitam Forest Reserve (AHFR) and Bukit Cerakah Forest Reserve (BCFR). The SLFR will serve as the main point or baseline acting as the “source” for the other three sites. From this study, a total species of birds recorded was 117, and the total abundance of bird for the first cycle was 385 individuals while for the second cycle, it was 392 individuals. This study revealed that bird abundance and species richness influenced by relative humidity, air temperature, season, location also dead tree abundance (standing and fallen). Overall, these significant parameters play an important role as the key habitat quality that influences bird abundance and species richness in an isolated forest.

ABSTRAK

Pemecahan hutan juga dikenali sebagai serpihan hutan, yang merupakan pemecahan luas besar, berdekatan, kawasan hutan menjadi lebih kecil dari hutan. Ia juga dipisahkan oleh jalan raya, pertanian, koridor utiliti, subdivisi, atau pembangunan manusia yang lain. Populasi terasing dalam landskap hutan berpecah belah bergantung kepada individu imigran yang bergerak dari hutan bersebelahan. Kajian ini adalah untuk mengkaji hubungan antara burung dan habitat di hutan terpencil di empat lokasi iaitu Hutan Simpan Sungai Lalang (SLFR), Hutan Simpan Bangi (BFR), Hutan Simpan Ayer Hitam (AHFR) dan Hutan Bukit Cerakah Rizab (BCFR). SLFR akan bertindak sebagai titik utama atau garis dasar yang bertindak sebagai "sumber" untuk tiga tapak lain. Dari kajian ini, jumlah spesies burung yang direkodkan adalah 117 dan jumlah burung yang banyak untuk kitaran pertama ialah 385 individu manakala bagi kitaran kedua ialah 392 individu. Kajian ini menunjukkan kelimpahan dan kekayaan spesies burung dipengaruhi oleh kelembapan relatif, suhu udara, musim, lokasi juga kelimpahan pokok mati (berdiri dan baring). Secara keseluruhan, parameter ini memainkan peranan penting sebagai kualiti habitat utama yang mempengaruhi kelimpahan dan kekayaan spesies burung di hutan terpencil.

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APPROVAL SHEET

I certify that this research project report entitled “Effects of Forest Patch Isolation on Bird Diversity” by Nurul Azirah Binti Mohd Yasin 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, Univerisiti Putra Malaysia.

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LIST OF ABBREVIATIONS

AHFR	Ayer Hitam Forest Reserve
BCFR	Bukit Cerakah Forest Reserve
BFR	Bangi Forest Reserve
SLFR	Sungai Lalang Forest Reserve
DBH	Diameter of Breast Height



CHAPTER 1

INTRODUCTION

1.1 Background

Tropical rainforests may well be the most differing biological system on the planet. Despite the fact that they cover under 7% of the planet's territory mass, they are home to half to 66% of the types of plants and creatures on the earth (Bierregaard, Lovejoy, Kapos, & Hutchings, 1992). The transformative theory about how much species of tropical rainforest trees may have emerged include native flow, habitation area in good conditions, or constant geographic isolation followed by remixing of species among climatic variability (Denslow, 1987). During the next couple of decades, tropical forest species will progressively developed restricted to isolated habitat fragments including a few of their normal ranges. It is consequently important to decide the impacts of forest fragmentation on tropical biotas and to devise plans that help relieve effects of large-scale deforestation (Laurance, 1994).

Forest fragmentation is known as forest patch, which is the breaking of large, contiguous, forested areas into smaller pieces of forest. It is also separated by roads, agriculture, man-made structure corridors, subdivisions, or other human development. For wildlife dependent upon forest environments, fragmentation of the forest results in the pattern of a mosaic of habitat patches surrounded by expenses of hostile terrain. Mader, 1984 (as cited in Bennett, 1990) advised that some species, especially for birds, may readily traverse gaps between patches of suitable habitat, but for many faunal species, even small habitat discontinuities may pose a distributional boundary, or a limitation to free movement. Historically, ecologists have assumed that a few tropical forest animals and plants survive in agricultural landscapes. This assumption is implicit in most forecasts of extinction rates, which are typically based on species-area relations and rates of destruction of the tropical

forest. Animal communities also change because of logging and habitat fragmentation. But existing forest fragments have enormous protection as refuges for endemic birds and other wildlife (Arcilla, Holbech, & O'Donnell, 2015).

Isolated populations in fragmented forest landscapes depend on immigrant individuals that travel from contiguous forest. This is the main way the populations can maintain their genetic variability (Mona, Ray, Arenas, & Excoffier, 2014). Habitat quality characteristics are also modified by fragmentation and the baseline biodiversity information is important to inform the stakeholders as they are inclined to convert them into commercial areas in the future. However, frequently hypothesized cause of a decrease in populations of migrant birds is the negative impact of habitat fragmentation in breeding success (Robinson, 1995). Birds are sensitive indicators of habitat conditions because each bird species has its distinctive breeding range and habitat requirements that can increase and decrease abundance or richness of bird species (Robbins, 1979).

Habitat fragmentation has three main components, that is a loss of the original habitat, decrease in habitat patch size, and increasing the isolation of habitat patches, all of which contribute to a failure in biological diversity within the original habitat (Henrik & Andren, 1994). Finally yet importantly, forest and biodiversity conservation in human-modified landscapes such as urban areas are necessary to provide ecosystem services (e.g. flood mitigation and water catchment).

1.2 Problem Statement / Research Question

The loss of tropical forest, and particularly of lowland forests, represents one of the greatest threats to bird diversity globally. Habitat fragmentation is a general phenomenon at all levels of spatial scales, and it applies to all living organisms (Lord

& Norton, 1990). Therefore, habitat fragmentation involves both sub-division and loss of the habitat and a corresponding increase in other habitats. There are two basic problems which are the remaining fragments large enough and close enough to each other to provide living space for dispersal or the effect of the surroundings and the external threat (Rolstad, 1991).

This study focused on the key factors of habitat quality which are significantly associated with bird abundance and species richness of bird in the fragmented forest. Other than that, is it fragmented forest gives a big impact on bird biodiversity?

1.3 Aim and Objectives

This study aimed to investigate the effects of the forest patch isolation on bird biodiversity. The specific objectives of this study were:

- i. To examine the relationship between bird abundance and habitat quality variables in isolated forests.
- ii. To determine the relationship between bird species richness and habitat quality variation in isolated forests.

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