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DIVERSITY, ABUNDANCE AND TRAP EFFICACY FOR CLASS INSECTA AT THE LOWLAND FOREST OF GUNUNG DATUK, NEGERI SEMBILAN

NURFATIN SOLEHAH BINTI MOHD BUSTAMAN

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AUTHOR'S DECLARATION

I declare that the work in this dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledge as referenced work. This dissertation has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

Name of Student	:	NurFatin Solehah Bt Mohd Bustaman
Student ID No.	:	2014452738
Programme	:	Master of Science (Applied Biology) –AS730
Faculty	:	Applied Science
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Signature of Student	:	.....
Date	:	May 2016

ABSTRACT

A study on the abundance and diversity of nocturnal and diurnal insects was conducted at the lowland area of Gunung Datuk, Negeri Sembilan. This study also evaluates the effectiveness of different sampling traps. Samples were collected from November 2014 to March 2015 using four different types of traps namely malaise, yellow-pan, pitfall and light traps. A total number of 25 insects' orders were recorded with the total individual of 4483. The most common order of insects found in this study was Hymenoptera (1479 individuals), Diptera (1279 individuals), Lepidoptera (210 individuals) and Coleoptera (159 individuals). The highest individual collected for malaise traps were Diptera (1028 individuals). Meanwhile, Hymenoptera recorded the highest individual for yellow-pan traps and pitfall traps with 307 and 963 individuals respectively. Light traps recorded Diptera as the highest individuals with 390. A total of 21% of nocturnal insects and 79% of diurnal insects have been collected in this study. There is no significant interaction ($P>0.05$) on total individual collected and trap used in this study. The highest diversity index is from light trap ($H'=1.87$) followed by yellow-pan trap ($H'= 1.86$), malaise trap ($H'=1.29$) and pitfall trap ($H'=0.61$). The H' values are significant only for yellow-pan ($P< 0.05$) but not for other traps. Two-way ANOVA showed a significant difference ($P<0.05$) between all traps. Yellow-pan trap was found to be the most efficient for this study compared to the other traps.

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CHAPTER ONE
INTRODUCTION

1.1 BACKGROUND OF STUDY

Insects are the most abundant animals on earth and two-third of the insects can be found in tropical rain forests. Tropical rain forest is believed to have more insect species where it provides diverse habitats with high species richness. It is normal to describe the new species in tropical rain forest (Zilihona and Numelin, 2001). Malaysia with its vast tropical rain forest is rich in biodiversity of flora and fauna. Most of the insects in Malaysia can be found in the lowland forest as it provides suitable habitats for thousands of insects' species which are important for forest ecosystem (Ahmad Said Sajap *et al.,* 1999). Increase in forest elevation may influence insects population, life-histories and morphology that lead to lack of resources, diversity and population size (Cambefort and Hanski, 1991).

Insects play an important role in maintaining ecosystem on earth. They are significant in the forest as they are needed during the primary production (grazing activities) and the decomposition phase (Lowman, 1982). Insects are also needed in the nutrient-transport chain among the trophic levels of food chain in the forest (Lindqvist and Block, 1998). Each species in the same trophic levels interact and influence each other through many ways whether through direct or indirect effects. This is depending on the temporal, morphological or chemical factors (Luisa *et al.,* 2014). There is a need to maintain the existence of insects in the ecosystem to ensure that all the major ecosystem services are functioning well. Besides, insects also have their own economic value by helping in ecosystem production that can be used for human well being.

Diversity and abundance of insects are important for ecosystem as they provide free services to maintain ecosystem on earth especially for terrestrial environments which insects are needed for their abundance, biomass and diversity (Zödl and Wittmann, 2003). Currently, insects diversity and abundance are decreasing rapidly compared to