



***GROWTH PERFORMANCE OF *Intsia palembanica* PLANTED UNDER
Pterocymbium javanicum AFTER ONE YEAR OF PLANTING***

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Pterocymbium javanicum AFTER ONE YEAR OF PLANTING**

By

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**Project Report Submitted in Partial Fulfilment of the Requirements
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DEDICATION

SPECIALLY AND SINCERELY DEDICATED TO

My supervisor

Assoc. Prof. Dr. Mohd Zaki Bin Hamzah

My beloved father and mother

Jasni Bin Kassim

Halimah Binti Kasim

My friends

Nur Hidayah Bt Mohd Pamuji

Husna Izzati Bt Hasanuddin

Nor Aznida Binti Darus

Maizatun Nadiah Bt Mahadi

Alyani Izzareena Bt Maskin

Nursuhaili bt Subahi

For the assistance, guidance, advices, understanding and support.

ABSTRACT

Intsia palembanica is classified as vulnerable by the IUCN Red List due to the risk of facing extinction due to deforestation. This slow growing heavy hardwood species is depleting in the natural forests but the demand of this tree species is very high in the timber market. Therefore, a trial plantation conducted at Ladang Ragut 3, Universiti Putra Malaysia, Selangor to evaluate the growth performance of *Intsia palembanica* under the canopy of *Pterocymbium javanicum*. This study was conducted over a period of six months of which total height, and diameter were recorded. This study consisted two blocks with the different canopy development of *P. javanicum* with the percentage of light penetration about 40% at Block 1 and 80% at Block 2. Each tree was planted at spacing 1.5 x 2.5 m. Based on the independent sample T-test result, the growth parameters of *I. palembanica* for both Block 1 and Block 2 showed significant difference ($p < 0.05$) with trees on Block 1 exhibited higher diameter and height increment. This result indicates that the trees are more adapted to shaded area.

ABSTRAK

Intsia palembanica diklasifikasikan sebagai lemah ancaman oleh Senarai Merah IUCN disebabkan oleh risiko yang dihadapi akibat penebangan hutan. Spesies kayu keras yang mempunyai pertumbuhan yang perlahan ini semakin berkurangan di hutan semula jadi tetapi permintaan spesies pokok ini sangat tinggi di pasaran kayu. Oleh itu, ladang percubaan dijalankan di Ladang Ragut 3, Universiti Putra Malaysia, Selangor untuk menilai prestasi pertumbuhan *Intsia palembanica* di bawah kanopi *Pterocymbium javanicum*. Kajian ini dijalankan sepanjang tempoh enam bulan di mana ketinggian keseluruhan, dan diameter dicatatkan. Kajian ini terdiri daripada dua blok dengan perkembangan kanopi *P. javanicum* dengan peratusan penembusan cahaya kira-kira 40% pada Blok 1 dan 80% pada Blok 2. Setiap pokok ditanam pada jarak 1.5 x 2.5 m. Berdasarkan hasil ujian T sampel bebas, parameter pertumbuhan *I. palembanica* untuk kedua-dua Blok 1 dan Blok 2 menunjukkan perbezaan yang signifikan ($p < 0.05$) dengan pokok-pokok di Blok 1 menunjukkan peningkatan diameter dan ketinggian yang lebih tinggi. Hasil ini menunjukkan bahawa pokok ini lebih disesuaikan dengan kawasan yang teduh.

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APPROVAL SHEET

I certify that this research project entitled “Growth Performance of *Intsia palembanica* planted under *Pterocymbium javanicum* after one year of planting” by Farah Wahida Binti Jasni 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

IUCN	International Union for Conservation of Nature
AGR	Absolute Growth Rate
RGR	Relative Growth Rate
FAO	Food and Agriculture Organization
FRIM	Forest Research Institute Malaysia



CHAPTER ONE

INTRODUCTION

1.1 General Background

Tropical rainforest is recognized as the richest ecosystem in the world in term of structure and diversity (Whitemore, 1998). The forest is the main sources for timber products besides contributing toward maintaining forest ecosystem and biodiversity. In Malaysia, the forest are estimated to cover about 19.55 million hectares, which is about 59.5% of the country area (Carle et al., 2002). As population increase, many area of natural forests been cleared for development, agriculture and industry. Between 1990 and 2010, Malaysia lost an average of 96,000 hectare or 0.43% per year. In total, between 1990 and 2010, Malaysia lost 8.6% of its forest cover or around 1,920,000 hectare. However, world demands for timber products keep increasing year by year while natural stands decline due to deforestation of natural forests.

Deforestation is a worldwide environmental issue (Sloan & Sayer, 2015). Deforestation, grazing and agriculture can profoundly affect regional climate and ecosystem functioning (Baron et al., 2000). Deforestation meets some human needs, it also has shortage, sometimes consequence, including social conflict, extinction of flora and fauna and climate change. As the total area of forest is declining, the extent of plantations is increasing (FAO, 2009). Plantation cannot meets all the aspects of natural forest, but the establishment of plantations may contributes wood resources in the area that have been degraded.

Tropical forest rehabilitation effort have tended to focus on the development of forestry and agroforestry systems aimed at maximizing productions of a very limited number of species or restoration plantings that aim to recreate the diverse forest ecosystem believed to have once occupied the site. The purpose of forest rehabilitation is to restore the capacity of degraded forest land to deliver forest products and services. Affected forest disappear around the world, causing massive extinction of species (Dirzo & Raven, 2003). Therefore, that species should be reintroduced to make sure the species still available in future.

Conversely, the secondary forest is rapidly increasing land – cover type in the tropics as a result of deforestation by logging and conversion to pasture and agricultural land (Clayton et al., 2010). Global demand for agricultural products such as food, feed, and fuel is now a major driver of cropland and pasture expansion across much of the developing world. Besides, the tree plantation can reduce soil erosion and also maintaining soil fertility. Forest plantation is easier to manage than natural forest because only selected species are planted in forest plantation. Forest plantation also has higher potential in producing raw materials compared to natural forest. Nowadays, degraded forest areas that has potential to be converted to forest plantation that can supply for timber production for future. In plantation program, the tree selection usually based on a few characteristics such as height, diameter and crown diameter. This characteristics should be taken considerations to evaluate the

growth performance. When the growth performance are recognized, it easier to predict the production from the plantation.

1.2 Problem Statement

Currently, many plantation are established for different purpose and majority are planted as monocultures with the aim of producing timber for paper, solid wood and fire wood. Monocultures are successful in efficient production of timber, have high resilience, and when well-managed, show no evidence of productivity decline (Evans, 2005). However, mixed-plantings have also been common and successful in many situations throughout history. Mixed species plantations can have higher rates of above- ground biomass production and carbon sequestration than monocultures. Mixed-species plantations may also reduce the incidence of disease or insect attack (Bosu et al., 2006). Besides that, most of the plantations only planted fast growing species such as *Hevea brasiliensis* and *Acacia mangium* that has the potential to meet the requirements of the domestic market on 15-years rotations compare to slow growing species such as *Instia palembanica*.

Because of that, most of the forest plantation in Malaysia do not want to take the risk planting slow growing species due to cost and time consuming. This slow growing heavy hardwood species are depleting in the natural forest and demand of this tree species in very high in the timber market. One of the heavy hardwood species that has potential for forest restoration is *Instia palembanica*. This species was categorized as a lesser known timber species

as recently as the early 1990s (Lemmens et al., 1994). The status of this species under IUCN is vulnerable. Besides, enrichment planting of this species in secondary forest might be contributed in the future natural resources for slow growing species.

The intensive research of information to this species might be due to lack of study or unrecorded research previously especially about the suitability of light intensity and the environmental factors that influence the growth of this species are not wide practising in plantation.

1.3 Objectives

The objectives of this study were:

- I. To determine the growth performance of *I. palembanica* under different shade canopy of *P. javanicum*.

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