



**UNIVERSITI PUTRA MALAYSIA**

***GROWTH PERFORMANCE OF Shorea materialis UNDER  
Pterocymbium javanicum AS A SHADE PROVIDER***

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**GROWTH PERFORMANCE OF *Shorea materialis* UNDER *Pterocymbium javanicum* AS A SHADE PROVIDER**

By,

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**Project Report Submitted in Partial Fulfillment of the Requirement  
for the Degree of Bachelor of Forestry Science in the Faculty of Forestry  
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## DEDICATION

SPECIALLY AND SINCERELY DEDICATED TO

My supervisor

**Assoc. Prof. Dr. Mohd Zaki Bin Hamzah**

My beloved parents

**Zakaria Bin Ahmad**

**Asmah Binti Ismail**

My dearest friends

**Nor Farah Wahidah Binti Abdul Aziz**

**Muhammad Hazwan Rafien**

**Soliah Md Isa**

**Nur Akmar Aulia Mohd Basri**

**Raja Nurul Illani Raja Ideras Badiuzzaman**

**26<sup>th</sup> Forester**

With grateful appreciation for their love and support

## ABSTRACT

*Shorea materialis* is the one of critically endangered species in a world. A trial plantation conducted at Ragut 3, Ladang Puchong, Universiti Putra Malaysia, Selangor to evaluate the growth performance of *Shorea materialis* under the line-planted *Pterocymbium javanicum* at Ragut 3, Ladang Pertanian Puchong, Universiti Putra Malaysia. This study was conducted for a four-month period of which tree diameter, leaf area, number of leaves, and total height are recorded. In addition, light intensity, relative humidity and temperature were recorded during morning, midday and evening to evaluate the environmental factors that may affect the growth performance. Based on the independent sample T-test result, the ( $p > 0.05$ ) for growth parameters of *S. materialis* for both Block 1 and Block 2 shows there is no significant different between blocks. Therefore, *S. materialis* has a potential to introduce in different habitat for conservation based on the growth performance in two blocks that has been planted under the *P. Javanicum*, but this study also should be prolonging to get the further and actual information about this species.

## ABSTRAK

*Shorea materialis* merupakan salah satu spesies yang terancam secara kritikal. Perladangan percubaan telah dilakukan di Ragut 3, Ladang Pertanian Puchong, Universiti Putra Malaysia, Selangor untuk menilai kadar pertumbuhan pokok Balau Pasir (*Shorea materialis*) dibawah pokok Melembu (*Pterocymbium javanicum*) yang telah ditanam secara berbaris di Ragut 3, Ladang Pertanian Puchong, Universiti Putra Malaysia. Penyelidikan ini dijalankan dalam jangkamasa 4 bulan, di mana diameter pokok, bilangan daun, luas permukaan daun dan jumlah ketinggian pokok telah direkodkan. Tambahan pula, parameter kadar pertumbuhan ini direkodkan keamaan cahaya, kelembapan, dan suhu telah direkodkan pada waktu pagi, tengahari dan petang untuk menilai faktor alam sekeliling yang berkemungkinan akan mempengaruhi kadar pertumbuhan Balau Pasir. Berdasarkan keputusan independent sample T-test yang dijalankan untuk kadar pertumbuhan pokok Balau Pasir (*S. materialis*) menunjukkan nilai ( $p > 0.05$ ), oleh itu, tiada perbezaan ketara di antara Blok 1 dan Blok 2. Oleh yang demikian, Balau Pasir mempunyai potensi untuk diperkenalkan di dalam habitat yang berbeza untuk pemuliharaan berdasarkan prestasi kadar pertumbuhan dalam dua blok yang telah ditanam di bawah Melembu, tetapi kajian ini juga perlu disambung untuk mendapatkan maklumat sebenar dan lebih terperinci tentang spesies ini.

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## APPROVAL SHEET

I certify that this research project entitled “**Growth Performance of *Shorea materialis* Under *Pterocymbium javanicum* As A Shade Provider**” by Murdani Bin Zakaria 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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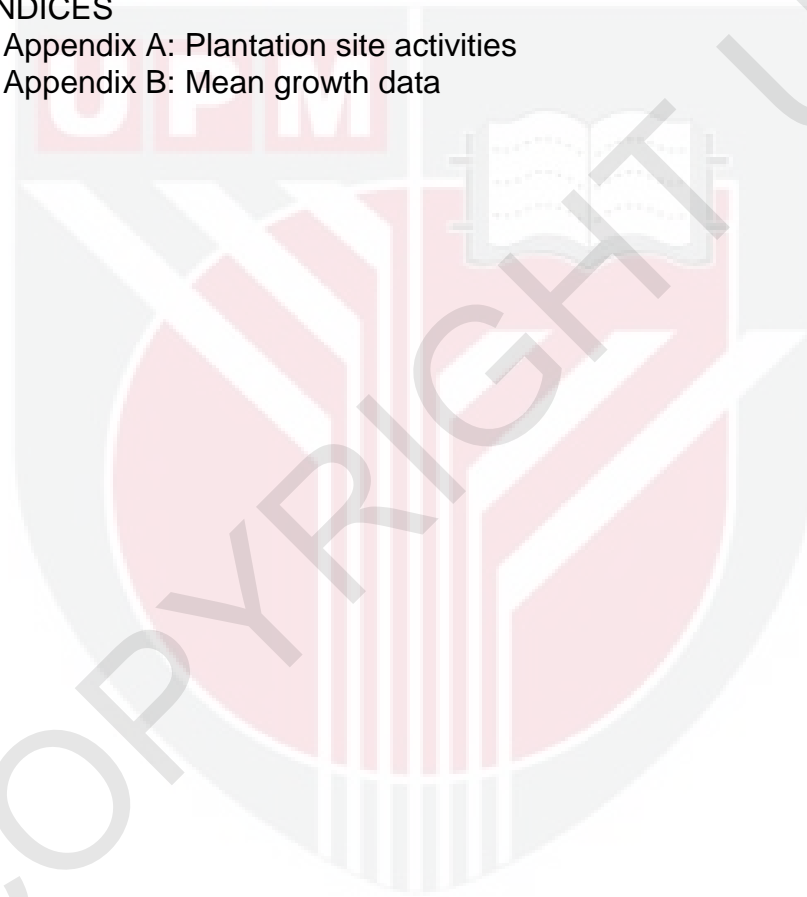
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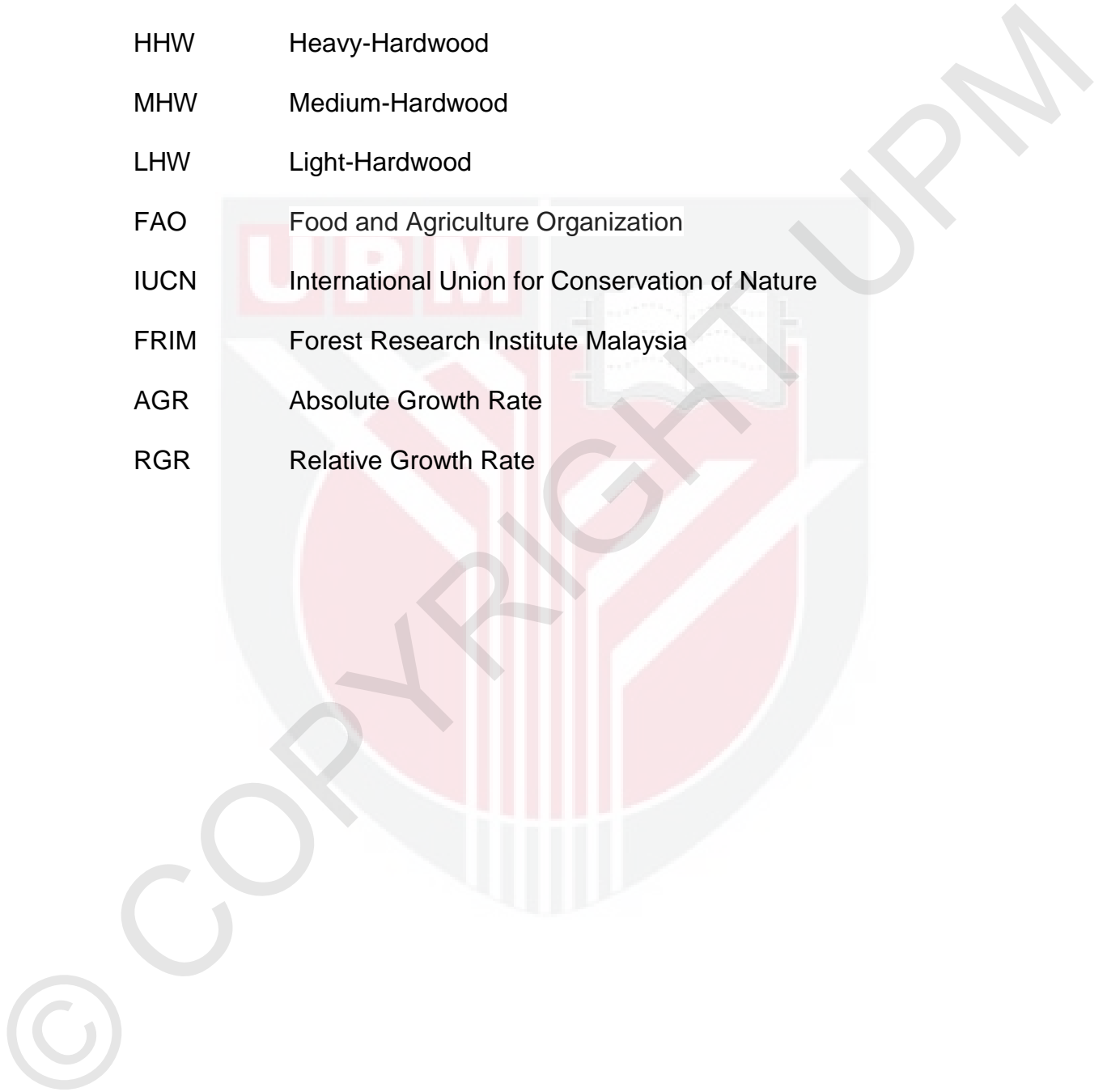
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## LIST OF ABBREVIATIONS

EP	Enrichment Planting
HHW	Heavy-Hardwood
MHW	Medium-Hardwood
LHW	Light-Hardwood
FAO	Food and Agriculture Organization
IUCN	International Union for Conservation of Nature
FRIM	Forest Research Institute Malaysia
AGR	Absolute Growth Rate
RGR	Relative Growth Rate



## CHAPTER 1

### INTRODUCTION

#### 1.1 Background

Tropical rainforests (TRF) are recognized as the richest ecosystems in the world in terms of structure and species diversity (Whitmore, 1998). According to Shukla et al. (1990), on a large regional and global scale, tropical rainforests (TRF) have an outstanding role and major influence in ameliorating and maintaining global climate change by reducing the accumulation of greenhouse gases. Though occupying only 7% of the earth's land surface, over half of the plane's life forms are found in tropical rainforests (Wilson, 1988). Tropical rainforests not only sustain biodiversity but provide homes to indigenous peoples, pharmacopeia of natural products, and provide crucial ecosystem services, such as flood amelioration and soil conservation.

Commercial logging activities, shifting cultivation, urbanization industry, natural disturbances like landslide and other forms of encroachment are all principal causes of deforestation in tropical regions (ITTO, 2002; Geist & Lambin, 2002). Montagnini et al. (1997) strongly stated that the conversion of forested areas to non-forest lands such as to pasture and agriculture have resulted in the permanent reduction of indigenous species including timber species such as *Dipterocarp* spp. from Dipterocarpaceae family.

Reforestation plays a vital role in maintaining our tropical rainforests and may offer one means of mitigating these processes of degradation while sustaining resident human communities. The importance of reforestation in the tropics includes productions of timber and other goods and services as well as aiding the recovery of biodiversity by re-establishing forest cover (Parrotta et al., 1997).

## 1.2 Problem Statement

However, lack of information regarding tree species performance has been identified as major limitation on the success and adoption of diversified reforestation strategies in restoring the tropical rainforests. According to research studies conducted by Arifin et al. (2008) in Peninsular Malaysia, stated that information on soil properties under rehabilitation of degraded forest land and growth performance including survival rate of planted dipterocarp species such as *Shorea macrophylla* and non-dipterocarp species is still limited. It also refers to the entire *Shorea sp.* This means also that the research study on the assessment of growth performance and survival rate of planted *Shorea materialis* is significant for future reforestation and rehabilitation efforts, especially in Malaysia.

*Shorea materialis* is a critically endangered (Ashton, 1998). Since *Shorea materialis* has been identified as one of the critically endangered species by

International Union for Conservation of Nature (IUCN), it is very crucial to conduct the study on the growth performance of this particular species and do the rehabilitation. This preliminary study is to clarify fundamental information on the suitability of *S. materialis* of Dipterocarpaceae family planted under the *Pterocymbium javanicum*. Hence, the aims of this study are to evaluate the growth performance and survival rate of planted *S. materialis* under the *P. javanicum* at Ladang 13 Puchong. Moreover, according to research studies conducted by Mat-Salleh et al. (2003), coastal forest is more favourable to *S. materialis* and this forest composition is different from other coastal forests that are mostly dominated by *Syzygium* sp. (Myrtaceae). This is one of the major factors why research has been conducted in Puchong, which is lowland forest, where *S. materialis* are introduced to a new habitat.

### 1.3 Objectives

The objectives of this study were:

- I. To determine the growth performance of *Shorea materialis*.
- II. To compare the growth performances of *Shorea materialis* planted in two blocks.



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