UNIVERSITI PUTRA MALAYSIA

GROWTH RATE OF Pterocymbium javanicum IN FOUR MONTHS PERIOD

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GROWTH RATE OF *Pterocymbium javanicum* IN FOUR MONTHS PERIOD

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 Universiti Putra Malaysia

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DEDICATION

بِسْمِ ٱللَّهِ ٱلرَّحْمَٰنِ ٱلرَّحِيمِ

MY SPECIAL DEDICATION GOES TO MY BELOVED PARENTS,

MOHD. RAFIEN BIN CHE MUSA AND NAZHA BINTI MD. SALEH

TO MY BELOVED SIBLINGS

NORHAZILA RAFIEN

HAZIQ RAFIEN

NURAFIQAH RAFIEN

RAFIUDDIN RAFIEN

FIRDAUS RAFIEN

IZZATI RAFIEN

TAUFIQ RAFIEN

SYIRAH RAFIEN

TO MY BELOVED AND SUPPORTIVE BEST FRIEND,

NORFARAH WAHIDAH, MURDANI, AND MY 26th FORESTER

MAY ALLAH S.W.T BLESS YOU ALL

ABSTRACT

Replanting of shade-tolerant species in open areas requires shading. Natural shading in the form of shade trees may provide the best solution. Selection of potential indigenous tree species as shade trees is important because in the past, exotics, such as *Acacia mangium* had been used. Therefore, this study was carried out in Universiti Putra Malaysia to elucidate the potential of *Pterocymbium javanicum* (melembu) shade tree. The aim of this study was to evaluate the growth performance of *P. javanicum* trees planted in line in two blocks. Tree growth data acquisition began in November 2015 through February 2016. The following parameters were measured, namely height of the tree, tree diameter breast height (DBH), crown height and crown diameter. The results showed a significant correlation ($P < 0.05$) between annual tree growth, tree diameter and height of trees. There is a relationship between light intensity and the performance parameters of plant growth and physiology of trees. Melembu has a potential to serve as shade trees due to its high tree growth and crown diameter at the age of two years.

ABSTRAK

Penanaman semula spesies tahan naung di kawasan terbuka memerlukan teduhan. Teduhan semula jadi dalam bentuk pokok teduh boleh memberikan penyelesaian yang terbaik. Pemilihan potensi spesies pokok asli sebagai pokok teduhan adalah penting kerana pada masa lalu, eksotik, seperti pokok-pokok *Acacia mangium* telah digunakan. Oleh itu, kajian telah dijalankan di Universiti Putra Malaysia untuk menjelaskan potensi *Pterocymbium javanicum* (melembu) pokok naungan. Tujuan kajian ini adalah untuk menilai kadar pertumbuhan *P. javanicum* di tanam atas garisan dalam dua blok. Pertumbuhan pokok perolehan data bermula pada November 2015 sehingga Februari 2016. Parameter berikut diukur, iaitu ketinggian pokok, ketinggian pokok diameter payudara (DBH), ketinggian silara dan diameter silara. Hasil kajian menunjukkan hubungan yang signifikan ($P < 0.05$) antara pertumbuhan pokok tahunan, diameter pokok dan ketinggian pokok. Terdapat perkaitan antara keamatan cahaya kepada parameter prestasi pertumbuhan tumbuhan dan fisiologi pokok. Melembu mempunyai potensi untuk berkhidmat sebagai pokok teduhan kerana pertumbuhan dan silara diameter pokok yang tinggi pada usia dua tahun.

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May Allah the Almighty blessing all of you, Amin Ya Rabba Al'amin.

APPROVAL SHEET

I certify that this research project entitled "Growth Rate of *Pterocymbium javanicum in Four Months Period*" by Muhammad Hazwan Bin Mohd Rafien has been examined and approved as a partial fulfilment of the requirements for the Degree of Bacholer of Forestry Science in the Faculty of Forestry, Universiti Putra Malaysia.

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LIST OF ABBREVIATIONS

AGR	Absolute Growth Rate
FAO	Food and Agriculture Organization
NO_3	Nitrate
RGR	Relative Growth Rate
RCBD	Randomiz Completely Block Design
SPSS	Statistical Package for Social Science
SE	Standard error

CHAPTER ONE

INTRODUCTION

1.1 General

The last decade has been marked by increasing environmental awareness throughout the world. Pollution, deforestation, global warming and conservation have come into the limelight of environmental impact assessment and “debt for nature” has become jargon for those aiming at better management of nature resources. Forest assets generally utilized all through the world for a large group of reasons and trees may be particularly abused, because of the specific properties of their timber, organic product or sap. A universally vital timber species might likewise be vital locally for its therapeutic and social quality. This can bring about substantial weight for use in the neighbourhood and universal scale.

Furthermore, the universal interest prompts the decay of an animal type in its regular territory. Endeavours to ensure the tolerable utilization of forest have, by large considered the effect of natural surroundings annihilation, instead of species focused for particular misuse. The degraded location is definitely a division of very poor biodiversity in addition to low physical substance or perhaps organic productive. Within some other expression, any degraded high area is a past high area drastically destroyed by the excessive collection connected with timber in addition to non-wood high solutions, very poor administration, repetitive flame, grazing or perhaps some other agitations or perhaps area make use of that will harm land in addition to facilities to your

level that will prevents or perhaps drastically delays the establishment connected with high immediately after abandonment.

Enrichment planting is a technique for endorsing manufactured regeneration involving forests in which seedlings involving favored wood trees and shrubs are generally rooted from the under-storey involving active logged-over woodlands and then given preferential remedy for you to inspire their particular expansion (Lamprecht, 1989). Due to the issues and complications included in substantial range properly involving logged around woodlands, the undertaking have been established in the form of substantial industry trial offers utilizing diverse devices with the objective involving acquiring prosperous tips for rehab involving logged woodlands (Pinso & Moura-Costa, 1993).

A pioneer species is often a species that is certainly the very first to establish itself in the location in which nothing is growing-or in the location that's been devastated by means of hearth and overflow. These species are generally annuals, evaporating following the subsequent season when perennials control. Leader species is usually classifies as indigenous species. These facilities are usually more boldly self-sowing as well as possessing ambitious underlying technique as well as each attributes. Pioneer species are open doors as colonizers of empty. It is as of now adjusted to development in uncovered regions with serious daylight, wide swings in temperature and supplement productive soil. The species are *Calophyllum* spp, *Azadiractha* spp, and *Neolamarckia* spp.

Shade trees is a tree that usually has a shade which has a large canopy and thick appearance that can prevent sun rays or even allow only a minimum amount puncture involving sun rays. Actually a new giving an excellent natural environment beneath the pine during a daytime (Brown, 1997). Within Sabah, your natural environment improvement power selected and planted 153, nine hundred hectares inside degraded natural environment inside 1995. Additionally, they selected and planted rapidly expanding hardwood and rapidly high quality timber for instance *Acacia mangium* and *Paraserianthes falcataria* along with types.

The selection types needs to mature properly inside weather, land and ecological ailments from the supposed sites. Giving her a very involving natural environment plantation will become much more substantially while they could possibly participate in position eventually nation's timber manufacturing approach. It's attractive attributes contain fast growth, great lumber high quality and building up a tolerance involving an array of garden soil and natural environment.

1.2 Problem statement

The knowledge about enrichment planting in secondary tropical forests and the performance of planted species are limited (Ådjers et al., 1995; Kammesheidt, 2002). Some of the important factors for the survival (Peña-Claros, 2002) and early growth (Denslow, 1987; Tuomela et al., 1996) of under-planted non-pioneer seedlings in tropical secondary forests are canopy

openness (Jennings et al., 1999) and the quality of light (Chazdon & Pearcy, 1991; Rijikers et al., 2000; Leakey et al., 2003) close to the forest floor.

The utilization of indigenous species as ranch species can substitute exotic species on the grounds that fascinating species have numerous issues like instabilities in term of market and less imperviousness to bother. Be that as it may, there are likewise issues in setting up the backwoods ranch which incorporate absence of data on nursery technique, information on silvicultural practices and development information for pioneer species.

In Malaysia, the quickly developing species ordinarily originated from light substantial hardwood timber, for example, Pterocymbium javanicum and this species can possibly turn into a shade supplier for replanting of overwhelming hardwood (which are by and large shade-resistance). The present absence of data with respect to development execution *P. javanicum* and the relationship between physiological, the prerequisite of light force and different parameters for the development execution is the mean purpose behind leading this study.

1.3 Objectives

The fundamental target of this study were to determine growth performance of *P. javanicum* and its potential as a shade provider.

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