UNIVERSITI PUTRA MALAYSIA

THE EFFECT OF UPMB10 AND PSEUDOMONAS SPP. ON PADDY GROWTH IN DIFFERENT DENSITY

ABDULLAH BIN SUWARDI

FP 2014 2

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ABDULLAH BIN SUWARDI

FACULTY OF AGRICULTURE
UNIVERSITI PUTRA MALAYSIA
SERDANG, SELANGOR DARUL EHSAN

2013/2014

THE EFFECT OF UPMB10 AND *PSEUDOMONAS* SPP. ON PADDY GROWTH IN DIFFERENT DENSITY

BY

ABDULLAH BIN SUWARDI

A project report submitted to Faculty of Agriculture, Universiti Putra Malaysia, in fulfillment of the requirement of PRT 4999 (Final Year Project) for the award of the degree of Bachelor of Agricultural Science

Faculty of Agriculture

Universiti Putra Malaysia

2013/2014

ENDORSEMENT

This project report entitled "**The effect of UPMB10 and *Pseudomonas* spp. on paddy growth in different density**" is prepared by Abdullah bin Suwardi and submitted to the Faculty of Agriculture in fulfillment of the requirement of PRT 4999 (Final Year Project) for the award of degree of Bachelor of Agricultural Science.

Student's name:	Student's signature:
ABDULLAH BIN SUWARDI	……………………………..

Certified by:

…………………………………………………….....

(ASSOC. PROF. DR. HALIMI BIN MOHD SAUD)

Project Supervisor,

Department of Agriculture Technology,

Faculty of Agriculture,

Universiti Putra Malaysia.

Date:

Dedicated to My Parents

Hj. Suwardi bin Bugi & Hjh. Masniah binti Katile

Support~Encouragement~Constant Love

ACKNOWLEDGMENT

Assalamualaikum W.B.T.,

In the name of Allah S.W.T., The Most Gracious, The Most Merciful. Thanksgiving to the Illahi for His grace I can completed this final year projects was successfully.

My sincere appreciation and gratitude to my supervisor, Assoc. Prof. Dr. Mohd Halimi Mohd Saud for his guidance, advice and help throughout this project.

Also thanks to the lecturers and staffs Department of Agriculture Technology, Department of Crop Science and Department of Land Management for their commitment to provide instructing. Also not be forgotten to my friends who are helping and providing moral support to me

Lastly, special thanks to my parent, Hj Suwardi and Hjh Masniah who is my soul and passion to complete this project.

Thank you. Wassalam.

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ABSTRACT

Oryza sativa or rice plant is a type of cereal crops and one of the most popular crops in worldwide. Malaysia with a population of 28 million people is not able to supply sufficient amount of rice and had to import it. This is due to the less area of cultivation. In production systems, farmers are using chemical fertilizer as the method to increase the plant growth. In long time effect, this method can affect to soil fertility, environment and to human beings. One of the cultivation techniques in increasing rice plant growth and yield are by implying several ways in maximising use of land and in the same time, it will contribute to sustainable agriculture. The objectives for this study are to determine the effect of the planting density and plant growth promoting rhizobacteria (PGPR) to increase rice plant growth. The project was carried out in a glasshouse using polybag with different seedling numbers (1 seedling per hill, 2 seedlings per hill and 3 seedlings per hill) and 5 ml ($1x10^8$ CFU/ml) different PGPR per plant (UPMB10, *Pseudomonas* spp. and UPMB10 mix with *Pseudomonas* spp.) will be inoculated into the soil three days and 31 days after transplanting (DAT). Each treatment with five replications will be arranged in Randomized Complete Block Design (RCBD) and data collected analysis with Analysis of Variance (ANOVA). The effect of the planting density and PGPR can be seen through a number of tiller, plant height, dry weight, root morphology and contain of nutrient after 45 days.

ABSTRAK

Oryza sativa atau tanaman padi adalah sejenis tanaman bijirin dan salah satu tanaman yang paling popular di seluruh pelusuk dunia. Malaysia dengan jumlah penduduk 28 juta orang tidak dapat membekalkan jumlah beras yang mencukupi dan terpaksa mengimportnya. Ini adalah kerana kawasan penanaman adalah kurang. Dalam sistem pengeluaran, petani menggunakan baja kimia sebagai kaedah untuk meningkatkan kadar pertumbuhan tanaman. Hakikatnya pada masa panjang, kaedah ini boleh memberi kesan kepada kesuburan tanah, alam sekitar dan manusia. Salah satu teknik penanaman dalam meningkatkan pertumbuhan tanaman padi dan hasil adalah dengan melaksanakan beberapa cara dalam memaksimumkan penggunaan tanah dan dalam masa yang sama, ia akan menyumbang kepada pertanian lestari. Objektif bagi kajian ini adalah untuk menentukan kesan kepadatan penanaman dan rhizobakteria penggalak pertumbuhan tanaman (PGPR) untuk meningkatkan pertumbuhan pokok padi. Projek ini telah dijalankan di dalam rumah kaca menggunakan pasu dengan bilangan anak benih yang berlainan (1 anak benih setiap lubang, 2 anak benih setiap lubang dan 3 anak pokok setiap lubang) dan 5 ml (1x108 CFU/ml) PGPR berbeza setiap tumbuhan (UPMB10, *Pseudomonas* spp. dan UPMB10 bercampur dengan *Pseudomonas* spp.) akan disuntik ke dalam tanah selepas tiga hari dan 31 hari selepas menanam (DAT). Setiap rawatan dengan lima replikasi akan disusun dalam Rekabentuk Rawak Berblok (RCBD) dan data analisis Analisis Varians (ANOVA). Kesan kepadatan tanaman dan PGPR dapat dilihat melalui bilangan sulur, ketinggian pokok, berat kering, morfologi akar dan kandungan nutrisi selepas 45 hari.

CHAPTER 1

INTRODUCTION

Rice (*Oryza sativa*) is one of the food groups to be a very high demand from all over the world as well as corn and wheat. In order to enhance production to satisfy consumers' needs, many transformations had been made such as development of variety, double cropping systems and high fertilizer rate usage, especially chemical fertilizers. The use of chemical fertilizers at the maximum rate admitted supplying sufficient nutrients to crops with a fast pace. However, the continuing provision to be felt in a long time on the quality of soil and the environment.

Malaysian did not have a large of crop acreage for planting of rice for fulfil local consumption and had to import rice from neighbouring countries such as Thailand and Myanmar because suitability land for rice planting either from soil type or fertility is less.

To overcome the shortage of the crop land and excessive use of chemical fertilizer there are two suggestions to increase the density of rice plants per hole and use of plant growth-promoting rhizobacteria (PGPR).

An amount of land suitable for rice cultivation is less and the usual rice cultivation system practiced by farmers in Malaysia is one seedling per hole does not guarantee the high production. This project will focus on a system where more than one seedlings hole. This is intended to maximize the usage of seedlings per hectare, simultaneously improve the quality and yield of rice.

Besides that, a plant growth-promoting rhizobacteria (PGPR) is one of biological alternatives to increase the rate of crop growth without given negative impact. Growth of a crop failure can be caused by lack of nutrients and nutrient formed are not readily used. Bacteria used in this project are nitrogen fixation bacteria (NFC) and phosphate solubilizing bacteria (PSB). These bacteria performance to provide nutrients in a suitable form and can be used by plants.

Thus, this project will be conducted to achieve this objective:

a. To observe the effect of difference bacteria to paddy growth
b. To determine the effect of difference density (number seedling per hill) to paddy growth
c. To determine the interaction between different bacteria and density to paddy growth

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