



UNIVERSITI PUTRA MALAYSIA

**ALLELOPATHIC EFFECT OF BATAWALI (*Tinospora tuberculata*) ON
WEEDS AND VEGETATIVE GROWTH OF SEVERAL RICE VARIETIES**

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AND VEGETATIVE GROWTH OF SEVERAL RICE VARIETIES

By

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CERTIFICATION

This study report entitled “ALLELOPATHIC EFFECT OF BATAWALI (*Tinospora tuberculata*) ON WEEDS AND VEGETATIVE GROWTH OF SEVERAL RICE VARIETIES” is prepared by Mohamad Syafiq Ashraf Bin Zamrillah and submitted to the Faculty of Agriculture in fulfillment of the requirement of PRT4999 (Final Year Project) for the award of the degree of Bachelor of Agricultural Science.

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ABSTRACT

Weed management using chemical herbicides inevitably results in environmental pollution, herbicide resistance, and harm farmers and ecosystem as well. This study was conducted to evaluate the allelopathic effect of Batawali (*T. tuberculata*) on weed control and early growth of several rice varieties. *T. tuberculata* leaves powder was applied as early post-emergence herbicide to four different rice varieties which were MR219, MR220, MR263, and MR269. Data on the percentage of injury or mortality in weeds, number of tillers, plant height, number of leaves, and leaves chlorophyll content were recorded at certain time intervals after *T. tuberculata* application. Data on the shoot and root dry weights were recorded prior to panicle initiation stage. Application of *T. tuberculata* powder extract results in good weed control. However, allelopathic effect of *T. tuberculata* was unable to inhibit the growth of *Leptochloa chinensis*. Significant differences were obtained on plant height, tillers and leaves production, and shoot and root dry weight between treated and control MR219 variety. Between treated and control MR220 variety, the significant difference obtained was on the production of tillers. Significant differences were obtained on number of tillers, number of leaves, and shoot and root dry weight between treated and control MR263 variety. Between treated and control MR269 variety, the significant differences were obtained on number of leaves, and shoot and root dry weight. In conclusion, allelopathic effect of *T. tuberculata* results in good weed control. It also has different stimulatory and inhibitory effect on early growth of different rice varieties. MR220 variety had the lowest inhibitory effect among the tested varieties.

ABSTRAK

Pengurusan rumpai menggunakan racun herba kimia pasti menyebabkan pencemaran alam sekitar, wujud ketahanan terhadap racun herba, dan memudaratkan petani dan juga ekosistem. Kajian ini dijalankan untuk menilai kesan allelopati Batawali (*T. tuberculata*) pada kawalan rumpai dan pertumbuhan awal bagi beberapa varieti padi. Serbuk daun *T. tuberculata* telah diaplikasikan sebagai racun rumpai pasca cambah peringkat awal ke atas empat varieti padi yang berbeza iaitu MR219, MR220, MR263, dan MR269. Data mengenai peratusan kecederaan atau kematian pada rumpai, jumlah anak padi, tinggi pokok, jumlah daun, dan kandungan klorofil daun telah direkodkan pada tempoh masa tertentu selepas aplikasi *T. tuberculata*. Data mengenai berat kering pucuk dan akar telah direkodkan sebelum peringkat pembentukan tangkai. Aplikasi ekstrak serbuk daun *T. tuberculata* memberi hasil kawalan rumpai yang baik. Walaubagaimanapun, kesan allelopati *T. tuberculata* tidak dapat merencatkan pertumbuhan *L. chinensis*. Perbezaan ketara diperolehi pada tinggi pokok, penghasilan anak padi dan daun, dan berat kering pucuk dan akar di antara varieti MR219 yang dirawat dan dikawal. Di antara varieti MR220 yang dirawat dan dikawal, perbezaan ketara diperolehi pada penghasilan anak padi. Perbezaan ketara diperolehi pada bilangan anak padi, bilangan daun, dan berat kering pucuk dan akar di antara varieti MR263 yang dirawat dan dikawal. Di antara varieti MR269 yang dirawat dan dikawal, perbezaan ketara diperolehi pada bilangan daun, dan berat kering pucuk dan akar. Secara kesimpulan, kesan allelopati *T. tuberculata* memberi hasil kawalan rumpai yang baik. Ia juga mempunyai kesan stimulasi dan perencatan yang berbeza pada

pertumbuhan awal varieti padi yang berbeza. Varieti MR220 mempunyai kesan perencatan yang terendah di antara semua varieti yang diuji.



CHAPTER

1.0 INTRODUCTION

Rice is a staple food for Malaysian and is grown on 673,745 ha of land in Malaysia. The annual production of paddy grain in Malaysia is about 2.6 million tons which also equals to RM 2 billion. Currently, the self-sufficiency level of Malaysian rice production is about 71.4 % and the remainder of 28.6 % is imported from other rice producer countries such as Thailand, Vietnam, Pakistan and India (Siwar et al., 2014).

One of the challenges in Malaysian rice production is weed management. In any crop field, weeds affect crop growth as well as crop productivity. Currently, weed management practices in paddy field is through chemical herbicides. The application of chemical herbicides in paddy field results in environmental pollution and might cause harm to human and ecosystem. Therefore, biological control is chosen as a tool for weed management in paddy field. One of the biological control methods is by using the allelopathic effect of specific plant to control weeds population. According to Inderjit & Keating (1999), allelopathy can be defined as the ability of a plant to stimulate or inhibit the growth of other plants by producing an allelochemicals.

The allelopathic effect of plant can be differentiate by additional factors which influence the effectiveness of allelopathic compounds in the environment such as different plant varieties which was conducted in this study. Based on the experiment conducted by Pukclai & Kato-Noguchi (2012), the inhibitory effect of the extract of *T. tuberculata* on shoots and root growth was different according to plant species. This indicates that there might be some differences on the effect of *T. tuberculata* on different rice varieties. The study, thus was designed to:

1. Evaluate the allelopathic effect of Batawali (*T. tuberculata*) on rice weeds control as early post-emergence application.
2. Quantify the vegetative growth responses of several rice varieties to the application of Batawali.

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