

EVALUATION OF DIFFERENT HERBICIDES APPLICATION TOWARDS WEED POPULATION AND AEROBIC RICE PERFORMANCE

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INTRODUCTION

Aerobic rice production is a revolutionary way of rice cultivation in well-drained, non-puddled, and non-saturated soils condition with very minimal water requirement. This idea was developed due to many limitations arose from flood irrigated rice conditions such as water scarcity and shortage of farm labor. However, weed management is a challenging issue in aerobic rice field, owing to no standing water to suppress weed germination upon early stage of rice development. High weed infestation has threatened the aerobic rice sustainability, which demands an efficient and cost-effective weed management technique. Weed controls include physical, mechanical, biological, and chemical control. However, this study focused on chemical control application due to other constraints by other weed control methods.



Pic 1: Aerobic rice field (right) and irrigated lowland field (left)



Pic 2: *Leptochloa chinensis* is one of the major weed in aerobic rice field

PROBLEM STATEMENT	Due to similarity of morphological characteristics between many grass weeds and rice, implementation of hand weeding is rather difficult, particularly at early stages of cultivation. By the time these weeds can be easily recognized by farmers, crop yield losses may already be inevitable. Achieving higher rice grain yields under aerobic conditions requires better weed management practices. Hence, chemical control of weed by herbicides offers and accommodates the most practical solution for weed management despite some undesirable side effects due to excessive application.
OBJECTIVE	To evaluate the response of weed flora to a diverse range of herbicides under field conditions for selecting suitable herbicides.
NOVELTY	The Malaysian aerobic rice variety MR1A 1 is a new variety released by MARDI when this study was carried out. Thus, this variety was selected due to very limited scientific research reported in the literature.
USEFULNESS	It is crucial to determine effective herbicides for weed control in aerobic rice which would aid to implement the most appropriate weed control method at right times and integrate different weed control approaches for a more sustainable and versatile weed management program.

METHODOLOGY

Pre-germinated rice seed were sown at the recommended seeding rate, under field condition.

Randomized Complete Block Design (RCBD) = 11 treatments x 3 replications

All herbicides were applied by using 300L of water per hectare with a 16L knapsack sprayer. Season long weed-free period was maintained through manual weeding whilst, for season long weedy period the weed growth was undisturbed. Parameter taken:

- Weed dry weight to determine Weed Control Efficacy (WCE) - A 25 cm x 25 cm quadrat was placed at three spots following zig zag pattern in every plot for recording of weed data upon harvest and expressed as g/m².
- Grain yield to determine Yield Increase Against Control (YOC) - The total number of grains/panicle (filled + unfilled), filled grains/panicle, percentage of grain filling [filled grains / (filled grains + unfilled grains) x 100], panicle weight and thousand grains weight were recorded upon harvest.

RESULTS

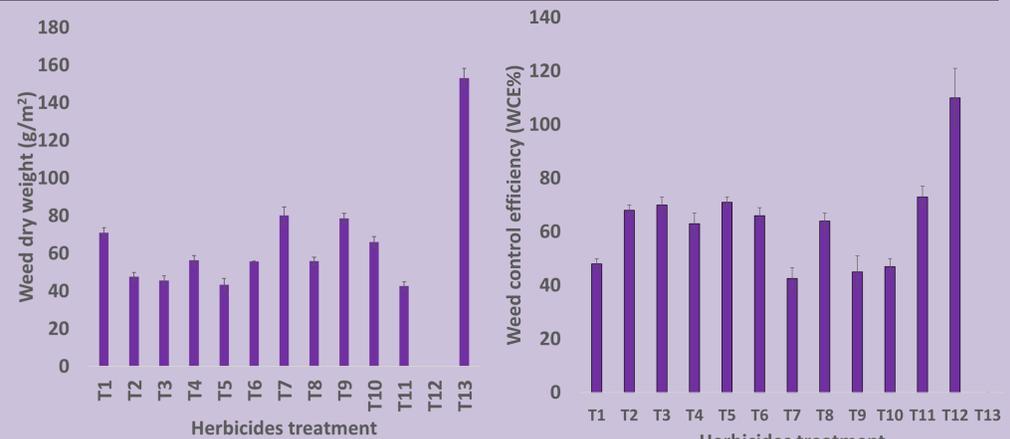


Figure 1: Weed dry weight (g/m²) upon harvest of rice as influenced by weed control treatments

Figure 2: Weed control efficiency (WCE) of different weed control treatments based on the weed dry weight at maturity of rice.

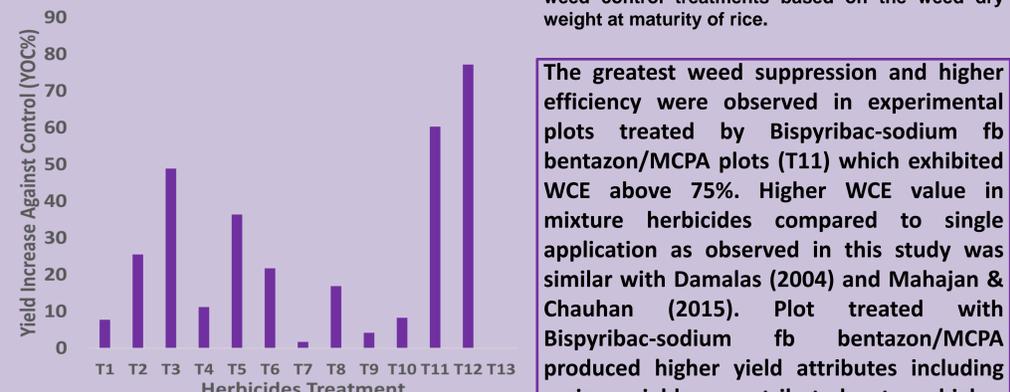


Figure 3: Yield increase against control (YOC%) upon harvest of rice as influenced by weed control treatments.

The greatest weed suppression and higher efficiency were observed in experimental plots treated by Bispyribac-sodium fb bentazon/MCPA plots (T11) which exhibited WCE above 75%. Higher WCE value in mixture herbicides compared to single application as observed in this study was similar with Damalas (2004) and Mahajan & Chauhan (2015). Plot treated with Bispyribac-sodium fb bentazon/MCPA produced higher yield attributes including grain yields contributed to higher percentage of YOC.

CONCLUSION

Weed management is the major challenge to the success of aerobic rice cultivation. Lack of control due to weed intervention may result in failure of aerobic rice seedlings development as well as severe losses of yield. Several practices of integrated weed management including chemical control have been applied to overcome this situation. However rotation of herbicides with different modes of action could solve this limitation.

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