OPTIMUM RATES OF TANK-MIX COMBINATIONS OF 2,4-D DIMETHYLAMINE AND BENSULFURON-METHYL ON CONTROL OF *Scirpus grossus* L.f

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By

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Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: **Optimum rates of tank-mix combinations of 2,4-D dimethylamine and bensulfuron-methyl on control of *Scirpus grossus* L.f** oleh **Noraziah Mohamad Yusof**, no. matrik: **UK 6973** telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperolehi **Ijazah Sarjana Muda Sains Gunaan (Pemuliharaan dan Pengurusan Biodiversiti)**, Fakulti Sains dan Teknologi, Kolej Universiti Sains dan Teknologi Malaysia.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

$p>0.05$	not significant
ppm	part per million
SD	standard deviation
a.i	active ingredient
ha	hectare
kPa	kilopascal
2,4-D	IUPAC name: (2,4-dichlorophenoxy) acetic acid
DAT	days after treatment
DAS	days after seeding
ANOVA	analysis of variance
LD_{50}	herbicide rates to kill population of test animals by 50%
ED_{50}	herbicide rates to inhibit plant growth by 50%
KADA	Kemubu Agricultural Development Authority
HSD	Tukey's Honestly Significant Difference
IBE	isobutyl ester
MSM	Multiplicative Survival Model
ADM	Additive Dose Model

LIST OF APPENDICES

ABSTRACT

The seeds of *Scirpus grossus* L.f were collected from rice fields at Nilam Puri, Kota Bharu, Kelantan. Dose-response experiment involving seedlings at 3 to 4-leaf stage in the greenhouse showed that the estimated ED_{50} of 2,4-D was only 1/18 the recommended application rate of 216 g a.i ha^{-1} while estimated ED_{50} of bensulfuron-methyl was approximately 1/17 times recommended rate of 40 g a.i ha^{-1}. Tank-mix combination experiments using 3 to 4 leaves plants were then carried out in the greenhouse to determine whether the tank mixture of 2,4-D dimethylamine and bensulfuron-methyl could provide control of *S. grossus*. Four tanks mixing of 2,4-D plus bensulfuron-methyl at 9+5 g a.i ha^{-1}, 36+1.25 g a.i ha^{-1}, 36+2.5 g a.i ha^{-1} and 36+5 g a.i ha^{-1} could provide good control of *S. grossus* with fresh weight reduction ranging from 90 to 93%. However, out of the nine tank mixtures, tank mixture of 2,4-D plus bensulfuron at 36+1.25 g a.i ha^{-1} was cost effective in controlling *S. grossus*. Single application of 2,4-D at 36 g a.i ha^{-1} was cost effective to control of *S. grossus* out of the six single herbicide applications. Six of the nine tank mixtures were antagonism while three of them gave additive responses. However, tank mixing 2,4-D with bensulfuron did not cause injury on paddy regardless of application rates.

KADAR KOMBINASI 2,4-D DIMETHYLAMINE DAN BENSULFURON-METHYL YANG OPTIMUM TERHADAP KAWALAN *Scirpus grossus* L.f

ABSTRAK

Biji benih *Scirpus grossus* L.f diperolehi dari sawah padi di Nilam Puri, Kota Bharu, Kelantan. Eksperimen gerakbalas dos melibatkan anak benih pada peringkat 3-4 helai daun di rumah hijau menunjukkan bahawa nilai jangkaan ED_{50} bagi racun 2,4-D adalah 1/18 kali berbanding dengan dos yang disyorkan iaitu 216 g a.i ha^{-1} sementara nilai jangkaan ED_{50} bagi bensulfuron kira-kira 1/17 kali dari dos yang disyorkan iaitu 40 g a.i ha^{-1}. Eksperimen kombinasi racun menggunakan 3-4 helai daun dijalankan di rumah hijau untuk menentukan sama ada kombinasi 2,4-D dan bensulfuron boleh mengawal *S. grossus*. Empat kombinasi racun 2,4-D dan bensulfuron-methyl dapat mengawal *S. grossus* iaitu pada kadar 9+5 g a.i ha^{-1}, 36+1.25 g a.i ha^{-1}, 36+2.5 g ai ha^{-1} dan 36+5 g a.i ha^{-1} dengan had pengurangan berat basah antara 90 sehingga 93%. Daripada sembilan kombinasi herbisid, kombinasi 2,4-D dan bensulfuron pada kadar 36+1.25 g a.i ha^{-1} adalah lebih kos efektif untuk mengawal *S. grossus*. Daripada enam herbisid tunggal, penyemburan 2,4-D secara berasingan pada kadar 36 g a.i ha^{-1} adalah paling kos efektif untuk mengawal *S. grossus*. Enam daripada sembilan kombinasi 2,4-D dan bensulfuron bertindak secara antagonistik manakala tiga daripadanya memberikan gerakbalas additif. Walau bagaimanapun, kesemua kombinasi 2,4-D dan bensulfuron tidak menyebabkan kecederaan terhadap padi.