

EFFICACY OF TANK-MIX COMBINATIONS OF GLYPHOSATE
AND ALIFLOXIMATE-AMMONIUM ON CONTROL OF
PARQUET-RESISTANT AND SUSCEPTIBLE BIOTYPES OF
GOOSEGRASS (*Elymus trisetus* (L.) Gaertn.)

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FAKULTI SAINS DAN TEKNOLOGI
KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA
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AND SUSCEPTIBLE BIOTYPES OF GOOSEGRASS
(*Eleusine indica* (L.) Gaertn.)

By

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Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: **Efficacy of Tank-Mix Combinations of Glyphosate and Glufosinate-Ammonium on Control of Paraquat-Resistant and Susceptible Biotypes of Goosegrass (*Eleusine Indica* (L.) Gaertn.)** oleh **Teh Hee Hao**, no. matrik: **UK 6367** telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperoleh ijazah **Sarjana Muda Sains (Sains Biologi)**, Fakulti Sains dan Teknologi, Kolej Universiti Sains dan Teknologi Malaysia.

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CONTENTS

	Page
ACKNOWLEDGMENTS	ii
LIST OF TABLES	vi
LIST OF FIGURES	vii
LIST OF SYMBOLS	viii
LIST OF APPENDICES	ix
ABSTRACT	xi
ABSTRAK	xii
CHAPTER 1 INTRODUCTION	1
CHAPTER 2 LITERATURE REVIEW	4
2.1 Goosegrass (<i>Eleusine indica</i> (L.) Gaertn.)	4
2.1.1 Distribution	4
2.1.2 Morphology	6
2.1.3 Ecology and habitat	8
2.1.4 Agricultural importance	8
2.1.5 Control of Goosegrass (<i>Eleusine indica</i> (L.) Gaertn.)	9
2.2 Herbicides	10
2.2.1 Paraquat	10
2.2.2 Glyphosate	16

2.2.3	Glufosinate-ammonium	23
2.3	Definition of susceptibility, tolerance and resistance	31
2.4	Herbicide-resistant goosegrass (<i>Eleusine indica</i> (L.) Gaertn.)	32
2.5	Herbicide mixture	36
CHAPTER 3 METHODOLOGY		38
3.1	Seed collection	38
3.2	Herbicides	39
3.3	Screening for the paraquat-resistant (R) and susceptible (S) biotypes	39
3.4	Dose-response experiments	40
3.4	Herbicide combinations experiments	42
CHAPTER 4 RESULTS		45
4.1	Dose-response of <i>Eleusine indica</i> (L.) Gaertn. to paraquat	45
4.2	Dose-response of <i>Eleusine indica</i> (L.) Gaertn. to glyphosate	48
4.3	Dose-response of <i>Eleusine indica</i> (L.) Gaertn. to glufosinate-ammonium	50
4.4	Combination of glyphosate and glufosinate-ammonium	52
CHAPTER 5 DISCUSSION		55
CHAPTER 6 CONCLUSION		60
REFERENCES		61
APPENDICES		65
CURRICULUM VITAE		87

LIST OF TABLES

Table		Page
1	Treatment of herbicide combination.	43
2	Goosegrass shoot weight reduction in the greenhouse three weeks after herbicide mixture application.	54

LIST OF FIGURES

Figure		Page
1	The distribution of <i>Eleusine indica</i> (L.) Gaertn. across the world in countries where it has been reported as a weed.	5
2	Goosegrass (<i>Eleusine indica</i> (L.) Gaertn.).	7
3	Interference of paraquat with electron flow at photosystem I.	14
4	Biosynthesis of the aromatic amino acids.	19
5	Amino acid biosynthesis.	21
6	Separate isozymes in the leaf cytoplasm, chloroplast and roots, and forms glutamine in a two-step process.	27
7	Structural formula of glutamate, glufosinate, methionine sulfoximine and tabtoxinine- β -lactam.	29
8	Log-logistic response regression line of goosegrass (<i>Eleusine indica</i> (L.) Gaertn.) in paraquat-resistant and susceptible biotypes to different rates of paraquat when the three to four-leaf stage (young stage).	47
9	Log-logistic response regression line of goosegrass (<i>Eleusine indica</i> (L.) Gaertn.) in paraquat-resistant and susceptible biotypes to different rates of glyphosate when the first inflorescence emerges (mature stage).	49
10	Log-logistic response regression line of goosegrass (<i>Eleusine indica</i> (L.) Gaertn.) in paraquat-resistant and susceptible biotypes to different rates of glufosinate-ammonium when the first inflorescence emerges (mature stage).	51

LIST OF SYMBOLS

ACCase	- acetyl CoA carboxylase
ADP	- adenosine diphosphate
a.i.	- active ingredient
ANOVA	- analysis of variance
ATP	- adenosine triphosphate
ED ₅₀	- 50% reduction in shoot fresh weight
EPSP	- 5-enolpyruvylshikimate-3-phosphate
HRAC	- Herbicide Resistance Action Committee
HSD	- Tukey's Honesty Significance Different
NADP	- nicotinamide adenine dinucleotide phosphate
PEP	- phosphoenolpyruvate
Pi	- phosphate
PS I	- photosystem I
PS II	- photosystem II
R	- paraquat-resistant
S	- paraquat-susceptible
S3P	- shikimic acid 3-phosphate
SAS	-Statistical Analysis System
WSSA	- The Weed Science Society of America

LIST OF APPENDICES

Appendix		Page
A	Chemical and physical properties of paraquat	66
B	Chemical and physical properties of glyphosate.	68
C	Chemical and physical properties of glufosinate-ammonium	69
D	Regression analysis paraquat-resistant (R) and susceptible (S) biotypes of <i>Eleusine indica</i> (L.) Gaertn. after application of paraquat	70
E	Analysis variances of shoot fresh weight reduction of both paraquat-resistant and susceptible biotypes of <i>Eleusine indica</i> (L.) Gaertn. after application of paraquat	72
F	Response of both paraquat-resistant (R) and susceptible (S) biotypes of <i>Eleusine indica</i> (L.) Gaertn. to paraquat at different rates.	73
G	Dose responses of both paraquat-resistant (R) and susceptible (S) biotypes of <i>Eleusine indica</i> (L.) Gaertn. after application of glyphosate	74
H	Analysis variances of shoot fresh weight reduction of both paraquat-resistant and susceptible biotypes of <i>Eleusine indica</i> (L.) Gaertn. after application of glyphosate.	76
I	Response of both paraquat-resistant and susceptible biotypes of <i>Eleusine indica</i> (L.) Gaertn. to glyphosate at different rates.	77
J	Dose responses of both paraquat-resistant (R) and susceptible (S) biotypes of <i>Eleusine indica</i> (L.) Gaertn. after application of Glufosinate-ammonium	78
K	Analysis variances of shoot fresh weight reduction of both paraquat-resistant and susceptible biotypes of <i>Eleusine indica</i> (L.) Gaertn. after application of ammonium-glufosinate.	80

L	Responses of both paraquat-resistant and susceptible biotypes of <i>Eleusine indica</i> (L.) Gaertn. to ammonium-glufosinate at different rates.	81
M	Analysis variances of shoot fresh weight reduction of both paraquat-resistant (R) and susceptible (S) biotypes of <i>Eleusine indica</i> (L.) Gaertn. after application of glyphosate plus glufosinate-ammonium.	82
N	Analysis variances of shoot fresh weight reduction of both biotypes of <i>Eleusine indica</i> (L.) Gaertn. after application of glyphosate plus glufosinate-ammonium.	84
O	Economical analysis of single herbicide and herbicide mixtures on goosegrass shoot weight reduction in the greenhouse three weeks after herbicide treatment.	86

ABSTRACT

Goosegrass (*Eleusine indica* (L.) Gaertn.) seeds were collected from Ladang RISDA Gerdong, Sungai Tong, Setiu, Terengganu. Screening of the putative paraquat-resistant and susceptible biotypes of goosegrass were conducted in the greenhouse. Dose-response experiment that conducted in the greenhouse involving three to four-leaf stage of paraquat-resistant (R) and susceptible (S) biotypes of goosegrass showed that the resistance index was 2.24. Tank-mix combination experiments were then carried out in the greenhouse to study the efficacy of tank mixtures of glyphosate plus glufosinate-ammonium on control of the R and S biotypes of goosegrass. Fresh weight reduction for all mixtures of glyphosate and glufosinate-ammonium were clearly less ($P < 0.05$) than predicted value of fresh weight reduction, irrespective of application rates, indicating strong antagonism between the two herbicides. Although all tank mixtures of glyphosate plus glufosinate-ammonium were antagonistic to goosegrass, these herbicide combinations still offered good control of both biotypes ranging from 71 to 89%. Economic analysis for this study revealed that the ideal and economic rate of herbicide combination treatment is to mix glyphosate at 300 g ai ha^{-1} with 25 g ai ha^{-1} glufosinate-ammonium. This tank mixture can provide good control (84%) of both biotypes of goosegrass. However, further studies should be conducted on combinations of other herbicides on control of goosegrass, in order to formulate tank mixtures resulting synergism.

KEBERKESANAN KOMBINASI GLIFOSAT DAN GLUFOSINAT-AMMONIUM UNTUK KAWALAN RUMPUT SAMBARI (*Eleusine indica* (L.) Gaertn.) YANG RINTANG DAN RENTAN TERHADAP PARAQUAT

ABSTRAK

Biji benih rumput sambari (*Eleusine indica* (L.) Gaertn.) telah dikutip dari Ladang RISDA Gerdong, Sungai Tong, Setiu, Terengganu. Penyaringan dijalankan di rumah hijau terhadap kedua-dua biotip putatif bagi rumput sambari yang rintang (R) dan rentan (S) terhadap paraquat. Eksperimen gerakbalas dos yang dijalankan terhadap biotip rumput sambari R dan S pada peringkat tiga hingga empat daun menunjukkan indeks kerintangan ialah 2.24. Eksperimen kombinasi herbisid dijalankan untuk mengkaji keberkesanan kombinasi glifosat dan glufosinat-ammonium untuk kawalan kedua-dua biotip R dan S di rumah hijau. Pengurangan berat basah bagi semua kombinasi glifosat dan glufosinat-ammonium jelas lebih rendah ($P < 0.05$) berbanding dengan nilai pengurangan berat basah ramalan tanpa dipengaruhi oleh kadar herbisid. Walaupun kombinasi glifosat dan glufosinat-ammonium adalah bersifat antagonistik, namun kedua-dua herbisid ini tetap memberi kawalan yang baik terhadap kedua-dua biotip, iaitu daripada 71% hingga 89%. Analisis secara ekonomik kajian ini menunjukkan kadar kombinasi 300 g ai ha⁻¹ glifosat dengan 25 g ai ha⁻¹ glufosinat-ammonium adalah paling kos-efektif terhadap kawalan kedua-dua biotip. Namun, kajian lanjutan perlu dijalankan terhadap kombinasi herbisid lain yang menghasilkan gerakbalas sinergistik untuk kawalan terhadap kedua-dua biotip.