

STUDY OF THE EFFECT OF PRESENCE OF  
*PERMISETUM POLYSTACHYON* (L.)  
ON THE GROWTH OF OTHER SPECIES

PERMISETUM POLYSTACHYON (L.)

FAKULTI SAINS DAN TEKNOLOGI  
UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA  
2006

CPN: 4748

1100046055



LP 54 FST 3 2006



1100046055

Assessment of allelopathic potential of Pennisetum Polystachy  
(L.) schult-on several weed and crop species / Shirley Maclaine  
ak Simoli.

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ASSESSMENT OF ALLELOPATHIC POTENTIAL OF *Pennisetum polystachyon* (L.)  
Schult. ON SEVERAL WEED AND CROP SPECIES

By

Shirley Maclaine ak Simoli

Research Report submitted in partial fulfillment of  
the requirements for the degree of  
Bachelor of Science (Biological Sciences)

Department of Biological Sciences  
Faculty of Science and Technology  
KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA  
2006

This project should be cited as:

Shirley, M.S. 2006. Assessment of allelopathic potential of *Pennisetum polystachyon* (L.) Schult. on several weed and crop species. Undergraduate thesis, Bachelor of Science in Biological Sciences, Faculty of Science and Technology, Kolej Universiti Sains dan Teknologi Malaysia, Terengganu. 64p.

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PROJEK PENYELIDIKAN I DAN II**

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: ASSESSMENT OF ALLELOPATHIC POTENTIAL OF *Pennisetum polystachyon* (L.) Schult. ON SEVERAL WEED AND CROP SPECIES oleh Shirley Maclaine ak Simoli, no. matrik: UK 8056 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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## ACKNOWLEDGEMENTS

First of all, I would like to express my deepest appreciation and very thankful to my main supervisor, Dr. Cha Thye San for his invaluable advice, comments and support throughout this study. Sincere thanks also go to my second supervisor, Dr. Chuah Tse Seng for the guidance and constructive suggestions.

Special thanks to my beloved parents for their everlasting love, support and encouragement to fulfill this thesis. I would like to take this opportunity to express my acknowledgement to my teammates, Franci ak Julop, Anne Marie Kaben, Suganthi Krishnan and Nor Asmah Jalil for their helps and support throughout this project. I also wish to thank all my housemates who bring so much happiness for me during my hard time.

It is my pleasure to thank to all the staff of Department Biology for their helps during this study. Last but not least, to all others who have contributed in one way or another to my work, I would like to say thank you for all the help and encouragement.

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## LIST OF ABBREVIATIONS

alt	altitude
ANOVA	Analysis of Variance
atm	atmosphere
FER	Ferulic acid
HEPES	4-2-hydroxyethyl-1-piperazineethanesulfonic acid
MES	Morpholino ethansulfonic acid
mOsmol/kg	milliosmol per kilogram
MPa	Mega pascal
Nd	Not determined
<i>p</i> - Cou	<i>p</i> - Coumaric acid
<i>p</i> - HBA	<i>p</i> - Hydroxy benzoic acid
PEG	Polyethylene glycol
rpm	rotations per minute
SD	Standard Deviation
SYR	Syringic acid
VAN	Vanillic acid

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## ABSTRACT

The allelopathic potential of *Pennisetum polystachyon* was investigated using several bioassay weed and edible crop species in laboratory. Bioassay species used in this study were *Amaranthus caudatus*, *Zea mays*, *Eleusine indica* and *Hedyotis verticillata*. Stem plus leaf and root extracts of *P. polystachyon* were assayed to determine their allelopathic effects on seed germination and leaf disc discoloration of bioassay species. pH and osmotic potential tests were also conducted for the possible pH and osmotic effects of the extracts. The percentage of germination of weed species was lower than that of edible crop species. There were no significant differences in seed germination when pH was increased from 5 to 7 for all bioassay species. PEG solutions decreased germination of *H. verticillata* when PEG concentration was increased from 0 to -0.20 MPa. Leaf discs tests showed that *Z. mays* and *E. indica* were more sensitive to the stem plus leaf and root extracts. This result suggests that these extracts might contain allelochemicals which should be investigated further in the laboratory and the field for practical application of the extracts as weed inhibiting agent.

# KAJIAN KEUPAYAAN ALLELOPATI EKSTRAK *Pennisetum polystachyon* (L.) Schult. TERHADAP BEBERAPA SPESIES RUMPAI DAN TANAMAN

## ABSTRAK

Keupayaan alelopati dalam *Pennisetum polystachyon* telah dikaji di makmal menggunakan beberapa jenis rumputai dan tanaman bioasai. Spesies-spesies bioasai yang digunakan dalam kajian ini ialah *Amaranthus caudatus*, *Zea mays*, *Eleusine indica* dan *Hedyotis verticillata*. Ekstrak batang dan daun serta akar *P. polystachyon* telah diasaikan untuk menentukan kesan alelopati terhadap percambahan biji benih dan perubahan warna cakera daun spesies-spesies bioasai. Ujian pH dan keupayaan osmotik juga telah dilakukan untuk mengkaji kesan yang disebabkan oleh pH dan keupayaan osmotik ekstrak tersebut. Peratus percambahan biji benih rumputai adalah lebih rendah daripada peratus percambahan biji benih tanaman. Tiada perbezaan ketara dalam ujian pH terhadap percambahan biji benih semua spesies bioasai apabila pH ditingkatkan daripada pH 5 hingga pH 7. Larutan PEG mengurangkan peratus percambahan biji benih *H. verticillata* apabila kepekatan PEG ditingkatkan daripada 0 hingga -0.20 MPa. Ujian cakera daun menunjukkan bahawa *Z. mays* dan *E. indica* adalah lebih sensitif terhadap ekstrak batang dan daun serta akar jika dibandingkan dengan kesemua spesies bioasai yang dikaji. Hasil kajian ini mencadangkan bahawa ekstrak tersebut mungkin mengandungi alelokimia yang boleh dikaji secara lebih lanjut dalam makmal atau di lapangan sebagai agen perencat rumputai.