

HERBICIDE RESISTANCE OF *Chromolaena odorata* (L.)

R. H. WONG & P. HIRAN AND *Aequoletia verticillata* Lam

FROM OIL PALM PLANTATIONS AND RUBBER

PLANTATIONS OF TERENGGANU

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FACULTY SCIENCE DAN TEKNOLOGI

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HERBICIDE RESISTANCE OF *Chromolaena odorata* (L.) R.M. King & Robinson
AND *Hedyotis verticillata* Lam FROM OIL PALM PLANTATIONS AND RUBBER
PLANTATIONS OF TERENGGANU

By

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Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: Herbicide Resistance of *Chromolaena odorata* (L.) R.M. King & Robinson and *Hedyotis verticillata* Lam from Oil Palm Plantations and Rubber Plantations of Terengganu oleh Noor Zalila binti Mohd Rahim, no. matrik: UK 6714 telah diperiksa dan semua pembedaan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperoleh ijazah Sarjana Muda Sains Gunaan (Pemuliharaan dan Pengurusan Biodiversiti), Fakulti Sains dan Teknologi, Kolej Universiti Sains dan Teknologi Malaysia.

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LIST OF ABBREVIATIONS / SYMBOL

Ppm	Part per million
a. i. ha ⁻¹	Active ingredient per hectare
%	Percentage
DAT	Day after treatment
ED ₅₀	Herbicide rate inhibit plant growth by 50%
HSD	Tukey Honestly Significant Test
a. e.	Active equivalent
P>0.05	Not significant
ANOVA	Analysis of variance
SD	Standard deviation

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ABSTRACT

This study was conducted in the greenhouse from June to December 2004 to screen for glyphosate, metsulfuron-methyl, triclopyr and paraquat-resistant (R) and susceptible (S) biotypes of *Chromolaena odorata* and *Hedyotis verticillata* at the 3 to 4 leaf stage. The seeds of *C. odorata* and *H. verticillata* were collected from six study sites in oil palm plantations and rubber plantations of Terengganu including RISDA Sungai Tong, Setiu, FELCRA Durian Burung, Kuala Terengganu, FELCRA Bukit Sudu, Kuala Terengganu FELCRA Bukit Kapah, Kuala Berang, FELCRA Bukit Kersing, Kuala Berang and FELDA Belara, Setiu. *Chromolaena odorata* from oil palm plantations of RISDA Sungai Tong has developed multiple-resistance towards both glyphosate and triclopyr while *C. odorata* from oil palm plantations of FELCRA Bukit Kapah was resistant to glyphosate. Herbicides resistant cases were not detected in oil palm plantations of FELCRA Durian Burung and FELCRA Bukit Sudu. *Hedyotis verticillata* from oil palm plantations of FELCRA Bukit Kapah and FELDA Belara were resistant to both glyphosate and paraquat herbicides. Three resistant cases were detected in rubber plantations of FELCRA Bukit Kapah where *H. odorata* was resistant to metsulfuron-methyl, triclopyr and paraquat. Paraquat-resistance was detected in oil palm plantations of FELCRA Bukit Sudu. No herbicide resistant case was detected in oil palm plantation of FELCRA Bukit Kersing. Dose response experiments were used to determine the level of herbicides resistance. Concentrations of herbicides required to kill 50% (ED₅₀) of the R and S biotypes were derived from log-logistic equations. Comparison of ED₅₀ value indicated that the resistant biotypes of *C. odorata* and *H. verticillata* are between 2 to 4-fold more resistant than their respective susceptible biotypes.

KERINTANGAN HERBISID DI LADANG KELAPA SAWIT DAN LADANG GETAH DI TERENGGANU

ABSTRAK

Kajian penyaringan biotip rintang (R) dan rentan (S) bagi *C. odorata* dan *H. verticillata* pada peringkat 3 hingga 4 helai daun terhadap glifosat, metil metsulfuron, triklopir dan parakuat dilakukan di rumah kaca dari bulan Jun sehingga Disember 2004. Biji benih *C. odorata* dan *H. verticillata* diambil dari enam kawasan penanaman kelapa sawit dan getah termasuk RISDA Sungai Tong, Setiu, FELCRA Durian Burung, Kuala Terengganu, FELCRA Bukit Sudu, Kuala Terengganu, FELCRA Bukit Kapah, Kuala Berang, FELCRA Bukit Kersing, Kuala Berang dan FELDA Belara, Kuala Terengganu. *Chromolaena odorata* dari ladang kelapa sawit RISDA Sungai Tong adalah rintang terhadap glifosat dan triklopir manakala *C. odorata* FELCRA Bukit Kapah adalah rentan terhadap glifosat. Tiada kes kerintangan herbisid di ladang kelapa sawit FELCRA Durian Burung dan FELCRA Bukit Sudu. *Hedyotis verticillata* dari ladang kelapa sawit FELCRA Bukit Kapah dan FELDA Belara pula adalah rintang terhadap glifosat dan parakuat. Tiga kes kerintangan dikesan di ladang getah FELCRA Bukit Kapah di mana *H. verticillata* adalah rintang terhadap metil metsulfuron, triklopir dan parakuat. Kerintangan terhadap parakuat dikesan di ladang kelapa sawit FELCRA Bukit Sudu. Sementara itu, tiada kes kerintangan dikesan di ladang kelapa sawit FELCRA Bukit Kersing. Eksperimen gerakbalas dos digunakan untuk menentukan aras kerintangan herbisid. Kadar herbisid yang diperlukan untuk membunuh 50% (ED_{50}) biotip R dan S diperolehi daripada persamaan log-logistik. Perbandingan nilai ED_{50} menunjukkan biotip rintang bagi *C. odorata* dan *H. verticillata* adalah di antara dua hingga empat kali lebih rentan daripada biotip S.