TABLE OF CONTENTS

	Page
Acknowledgement	iii
Abstract (English)	iv
Abstract (Thai)	vii
List of Tables	ix
List of Figures	xiii
Introduction	1
Chapter 1 Literature review	5
Chapter 2 Phenotype variation in purple rice varieties	26
2.1 Introduction	26
2.2 Materials and methods	27
2.3 Result	28
2.4 Discussion	35
Chapter 3 Gamma oryzanol content in purple rice varieties	41
3.1 Introduction	41
3.2 Materials and methods	43
3.3 Results g h t S r e S e r v e	45
3.4 Discussion	49

Chapter 4 Effect of N P K fertilizer to Gamma oryzanol content	
in purple rice varieties	
4.1 Introduction	51
4.2 Materials and methods	52
4.3 Result	56
4.4 Discussion	64
Chapter 5 Heritability of Gamma Oryzanol in Local Purple	68
Glutinous Rice Genotypes	
5.1 Introduction	68
5.2 Materials and methods	71
5.3 Result	72
5.4 Discussion	76
Discussion	79
Reference	89
Curriculum Vitae	105

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่ Copyright[©] by Chiang Mai University All rights reserved

LIST OF TABLES

Table		Page
2.1	The color of leaf blade, leaf sheath, node, internode, auricle, ligule and	30
	the shape of ligule and tiller in purple rice	
2.2	Main stem diameter, ligule length, width and length of flag leaf,	32
	whole grain and unpolished grain and length-width ratio	
2.3	The color of stigma, apiculus, awn, glume, pericarp and panicle shape	35
	in purple rice collection	
3.1	The average of crude oil, semi-purified γ -oryzanol and γ -oryzanol	48
	contents in purple rice genotypes in comparison to the white rice	
	genotypes	
3.2	Correlation coefficients between oil, semi-purified γ -oryzanol and	48
	γ-oryzanol contents in purple rice collection	
4.1	Nitrogen, phosphorus and potassium fertilizer in soil	53
4.2	Response of Gamma oryzanol content (mg/100g grain) in purple rice	57
	and white rice to the different nitrogen fertilizer levels	
4.3	Crude oil content (g/100g grain) in purple and white rice at different	58
	nitrogen fertilizer level	
4.4	Semi purified gamma oryzanol content (g/100g grain) of purple rice	58
	and white rice at different nitrogen fertilizer level	

Table		Page
4.5	Gamma oryzanol content in purple rice and white rice at different	59
	phosphorus fertilizer level	
4.6	Crude oil content in purple rice and white rice at different phosphorus	60
	fertilizer level	
4.7	Semi purified gamma oryzanol content in purple rice and white rice at	61
	different phosphorus fertilizer level	
4.8	Gamma oryzanol content in purple rice and white rice at different	62
	potassium fertilizer level	
4.9	Crude oil content in purple rice and white rice at different potassium	63
	fertilizer level	
4.10	Semi purified gamma oryzanol content in purple rice at different	63
	potassium fertilizer level	
5.1	Crude oil content in seeds of F ₃ populations and its derived	
	73 ALTERS	
	F ₄ populations	
5.2	Semi-purified γ -oryzanol content in seeds of F_3 populations and its	
	74ธิบหาวิทยาลัยเชีย อโ	
	derived F ₄ populations	
5.3	Gamma Oryzanol contents in seeds of F ₃ populations and its	75
	derived F ₄ populations	

LIST OF FIGURES

	LIST OF FIGURES	
Figu	re	Page
2.1	Grain shape of unpolished grain in purple rice collection	34
2.2	Variation of leaf sheath color in purple rice varieties	38
2.3	Variation of leaf blade color in purple rice varieties	38
2.4	Variation of node and inter node color in purple rice varieties	39
2.5	Variation of auricle and ligule color in purple rice varieties	39
2.6	Color variations in purple rice varieties	40
2.7	Color variations of husk and pericarp in purple rice varieties	40
3.1	Chromatogram of γ -oryzanol standard in the analytical reverse-phase HPLC	44
3.2	Crude oil contents in purple rice and the white rice check varieties	45
3.3	Semi purified gamma oryzanol contents in purple rice and the white	46
	rice check varieties	
3.4	Gamma oryzanol contents in purple rice and the white rice check varieties	47
4.1	Chromatogram of γ -oryzanol standard in the analytical	2 0 54
	reverse-phase HPLC	
4.2	Chromatogram of γ -oryzanol of RD6 responsed to N-fertilizer	55
	in the analytical reverse-phase HPLC	

4.3	Chromatogram of γ -oryzanol of RD6 responsed to P-fertilizer	55
	in the analytical reverse-phase HPLC	
Figur	e	Page
4.4	Chromatogram of γ -oryzanol of RD6 responsed to P-fertilizer	56
	in the analytical reverse-phase HPLC	
5.1	Chromatogram of γ -oryzanol standard in the analytical	71
	reverse-phase HPLC	
5.2	Chromatogram of γ -oryzanol in F4 generation in the analytical	72
	reverse-phase HPLC	
5.3	Regression of Gamma Oryzanol contents of derived F4 lines	76
	on the its F3 generation lines	

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่ Copyright[©] by Chiang Mai University All rights reserved