

Table of Contents

	Page
Acknowledgements.....	iii
Abstract in English.....	iv
Abstract in Thai.....	viii
List of Tables.....	xvi
List of Figures.....	xviii
Chapter I Introduction.....	1
Chapter II Literature Review.....	7
2.1 Definition of Crop Diversity.....	7
2.2 Measuring Crop Diversity.....	8
2.3 Threat to Rice Genetic Diversity.....	10
2.4 Disadvantages and Advantages Crop Plant Diversity.....	14
2.5 Diversity in Crop-based Agro-ecosystems.....	15
2.5.1 Diversity among species.....	15
2.5.2 Diversity among cultivars within species.....	16
2.5.3 Diversity among plants within cultivars.....	17
2.6 Rice-based Agricultural Systems in Laos.....	17
2.7 Rice diversity based on ecosystems in Laos.....	19
2.7.1 Rice diversity in the rainfed lowland environment.....	20
2.7.2 Rice diversity in the rainfed upland environment.....	20
2.8 Diversity of land races of rices.....	21
2.9 Conservation of Lao national rice gremplasm.....	22
2.10 Farmers Management of diversity.....	23
Chapter III Materials and Methods.....	25
3.1 Field Survey.....	25
3.1.1 Site Selection.....	25
3.1.2 Methodology.....	25
3.2 Field Experimentation.....	26
3.2.1 Experimental Location.....	27
3.2.2 Methodology.....	27

3.2.3 Data Collection	28
3.3 Crop survey	28
3.3.1 Farm Selection	28
3.3.2 Methodology	29
3.4 Data Analysis	30
3.4.1 Field Survey	20
3.4.2 Crop Survey	30
3.4.3 Field Experiment	31
Chapter IV Results	32
4.1 Field Survey	32
4.1.1 Description of each village	33
4.1.2 Agricultural Systems	34
4.1.3 Rice Varieties	36
4.1.4 Variety Adaptation and Seed lot management	38
4.1.5 Rice Cultivated Area in the study area and soil characteristics	42
4.1.6 Grain Characterization of rice variety in the study area	43
4.1.6.1 Diversity within rice samples collected from the study site	51
4.1.6.2 Lemma and palea pubescence (LPP)	51
4.1.6.3 Awning (AW)	52
4.1.6.4 Awn color (AC)	53
4.1.6.5 Apiculus color (APL)	54
4.1.6.6 Lemma and palea color (LPC)	55
4.1.6.7 Sterile lemma color (SL)	56
4.1.6.8 Seed coat color (SCC)	57
4.2 Field Experiment	58
4.2.1 Grain Weight	58
4.2.2 Grain yield and Harvest index	59
4.2.3 Grain shape	60
4.2.4 Leaf width and length	64
4.2.5 Plant height, tiller, and panicle production	65
4.2.6 Variation between and within seed lots	66
4.2.6.1 The upland plot	66

4.2.6.2 The lowland plot	67
4.2.7 Diversity of Plant Morphology	69
4.2.7.1 Leaf blade color (LBC).....	69
4.2.7.2 Basal leaf sheath color (BLSC).....	70
4.2.7.3 Leaf blade pubescence (LBP).....	71
4.2.7.4 Ligule color (LC).....	72
4.2.7.5 Collar color (CC).....	73
4.2.7.6 Auricle color (AC).....	74
4.2.7.7 Flag leaf angle (FLA).....	75
4.2.7.8 Awning (AW).....	76
4.2.7.9 Apiculus color (APL).....	77
4.2.7.10 Seed coat color (SCC).....	78
4.2.7.11 Lemma and palea pubescence (LPP).....	79
4.2.7.12 Lemma and palea color (LPC).....	80
4.2.7.13 Sterile lemma color (SL).....	81
4.2.8 Variety maturity	82
4.3 Crop Survey	83
4.3.1 Yield components	85
4.3.2 Diversity within farmers' fields.....	88
4.3.3 Variance Analysis	91
Chapter V Discussion	93
Chapter VI Conclusion	97
References.....	98
Appendices.....	104
Curriculum Vitae	118

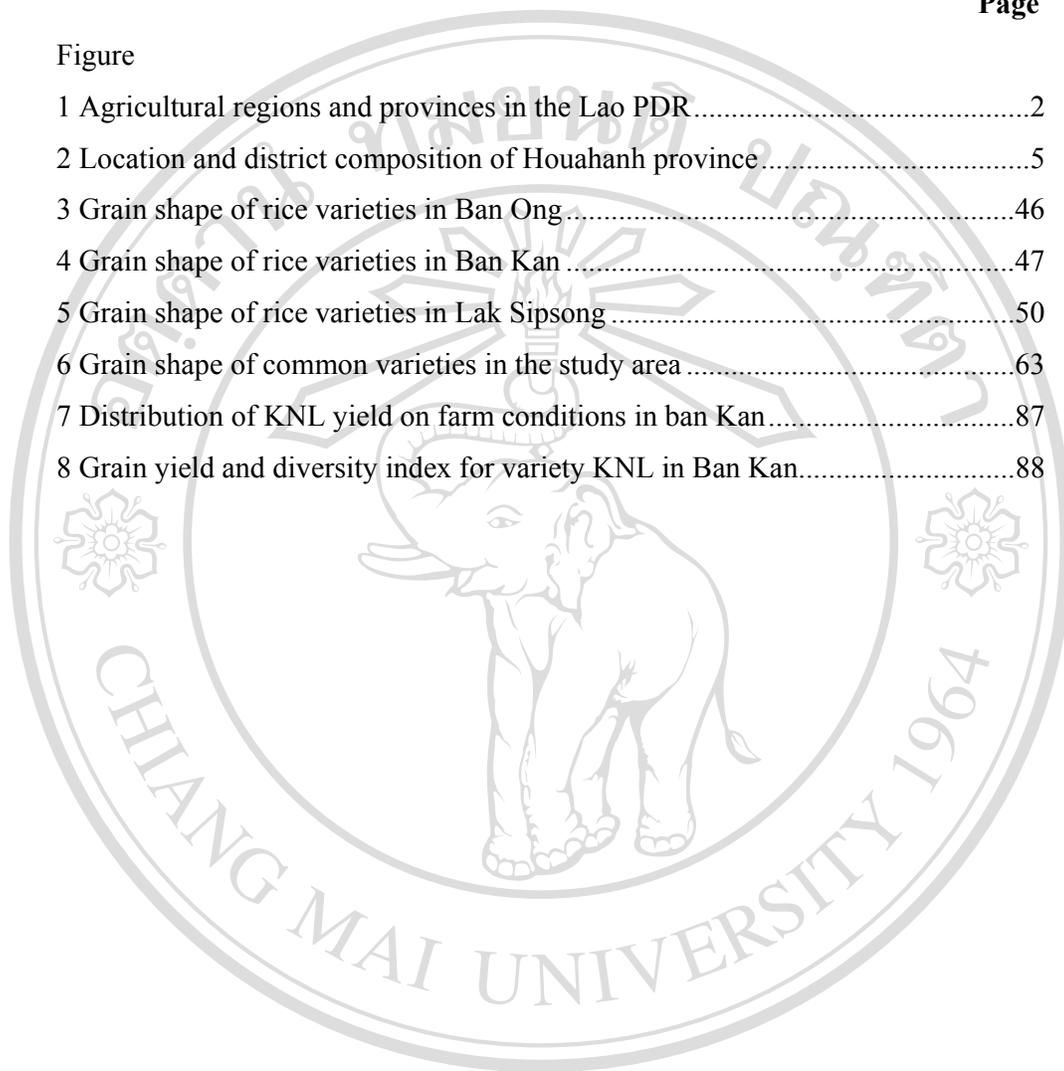
List of Tables

	Page
Table	
1 Variety samples studied in the field experiment.....	27
2 Characterization of respondents in the three villages	33
3 Population in the study area	34
4 Crop cultivated area in villages in the study area	36
5 Number of rice varieties found in three villages.....	37
6 Number of rice varieties grown by a household	38
7 Varieties richness in the study area.....	38
8 Characteristics of varieties based on farmers' perception	41
9 Planted rice production in the study area.....	42
10 Soil characteristics in the study area.....	43
11 Grain characteristics of rice varieties in the study area	44
12 Variation of grain shape among varieties found in Ban Ong.....	45
13 Variation of grain shape among varieties found in Ban Kan.....	48
14 Variation of grain shape among varieties found in Ban Lak Sipsong	49
15 Distribution, diversity index of lemma and palea pubescence	52
16 Awing between varieties and seed lots	53
17 Distribution of awn color among seed lots and varieties.....	54
18 Distribution of apiculus color between and within variety	55
19 Diversity index for lemma and palea color.....	56
20 Sterile lemma color and its diversity	57
21 Seed coat color and its diversity within varieties.....	58
22 1000-grain weights of most popular varieties in the study area	59
23 Yield of most popular varieties in the field experiment	60
24 Length and width of spikelets (mm) of the seed lots from the study area- and pure line variety.....	61
25 Grain shape variation within 9 seed lots and 6 varieties in the study are	62
26 width and length of leaves in 9 rice samples (cm).....	64
27 Tiller and panicle production	65
28 Variation of grain shape among seed lots and varieties.....	66

29 Summaries of variance analysis in upland plot.....	67
30 Variation of grain shape within seed lot	67
31 Variance analysis of grain shape.....	68
32 Variance analysis of lowland plot.....	68
33 Comparison of grain L/W ratio between seed lots using T test	68
34 Distribution of leaf blade color	70
35 Basal leaf sheath color	71
36 Leaf blade pubescence	72
37 Ligule color distribution	73
38 Collar color distribution	74
39 Auricle color distribution	75
40 Flag leaf angle distribution	76
41 Awning distribution	77
42 Apiculus color distribution	78
43 Seed coat color distribution	79
44 Lemma and palea pubescence distribution	80
45 Lemma and palea color distribution	81
46 Sterile lemma distribution.....	82
47 Variation of rice samples collected from farmers in the study area	83
48 Yield components of KNL variety on farm condition	85
49 Mean of grain and straw weight among farmers' fields	86
50 Lemma and palea pubescence, and awning distribution on fields.....	89
51 Leaf blade pubescences, and off-type plants distribution on fields	90
52 Summaries of the Shannon Diversity Index (H') on farmers' fields.....	91
53 Summaries of variance analysis of crop survey on farm conditions	92

List of Figures

Figure	Page
1 Agricultural regions and provinces in the Lao PDR.....	2
2 Location and district composition of Houahanh province.....	5
3 Grain shape of rice varieties in Ban Ong.....	46
4 Grain shape of rice varieties in Ban Kan.....	47
5 Grain shape of rice varieties in Lak Sipsong.....	50
6 Grain shape of common varieties in the study area.....	63
7 Distribution of KNL yield on farm conditions in ban Kan.....	87
8 Grain yield and diversity index for variety KNL in Ban Kan.....	88



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

Copyright © by Chiang Mai University

All rights reserved