

TABLES OF CONTENTS

CHAPTER		PAGE
ABSTRACT		i
ABSTRAK		iii
ACKNOWLEDGEMENTS		v
LIST OF TABLES		ix
LIST OF FIGURES		xi
LIST OF ABBREVIATIONS		xiv
CHAPTER ONE	INTRODUCTION	1
CHAPTER TWO	LITERATURE REVIEW	
2.1	<i>Channa striata</i>	3
2.1.1	Taxonomy	3
2.1.2	Morphology	4
2.1.3	Habitat and Distribution	4
2.1.4	Economic Importance / Medical Importance	5
2.2	Genetic Diversity on <i>Channa striata</i>	6
2.2.1	Mitochondrial DNA	6
2.2.2	Microsatellite	8
2.2.2.1	Definition of microsatellite	8
2.2.2.2	Advantages of Microsatellite	9
2.2.2.3	Disadvantages of Microsatellite	9
2.2.2.4	Application of Microsatellites Markers in Fisheries Science	10
2.3	Cross amplification of <i>Cyprinus carpio</i> in <i>Channa striata</i>	11
2.3.1	Taxonomy of <i>Cyprinus carpio</i>	11
2.4	Population Genetic studies	12
2.4.1	Genetic variations	12
2.4.2	Gene Flow	12
2.4.3	Heterozygosity (<i>H</i>)	12
2.4.4	Allele frequency	13
2.4.5	Genotype frequencies (<i>P</i>)	13
2.4.6	Percentage of polymorphic loci (<i>L</i>)	14
2.4.7	Linkage Disequilibrium (<i>D</i>)	14
2.4.8	Null Allele	15

CHAPTER THREE

METHODOLOGY

3.1 Collection of samples	16
3.2 Isolation of Genomic DNA	18
3.3 RAMs Primers	19
3.4 PCR Amplification	20
3.5 Cloning	20
3.6 Colony PCR	21
3.7 Plasmid Extraction	22
3.8 DNA Sequencing	23
3.9 Submission of DNA Sequences to GenBank	23
3.10 Design of Primers Flanking Microsatellite Regions	24
3.11 Microsatellite Amplification	24
3.11.1. Standard PCR	24
3.11.2. Touchdown PCR	25
3.12 Blast Analysis of Microsatellite Markers	26
3.13 Data Analysis	27
3.13.1. Microchecker software	27
3.13.2. Convert (Version 1.31) software	27
3.13.3. GenePop (Version 4.0) software (Rousset, 1997)	27
3.13.4. PopGene (Version 1.31) software	28
3.13.5. Phylip (Version 3.67) software	28
3.13.6. Arlequin (Version 3.1) software	28
3.13.7. Structure (Version 2.2) software	29

CHAPTER FOUR

RESULTS

4.1 Isolation and Development of Microsatellite Markers	30
4.1.1. PCR amplification of RAMs primers	30
4.1.2. Colony PCR	33
4.1.3. Plasmid Extraction	34
4.1.4. Sequencing results	35
4.1.5. Optimization of Microsatellites Primers	36
4.1.6. Heterozygosity	41
4.1.7. Polymorphic test on 30 individuals.	42
4.1.8. Data Analysis	44
4.2. Cross species amplification of microsatellite primers in <i>Channa striata</i>	48
4.3. Population genetic studies in six populations of <i>Channa striata</i>	52
4.3.1. Genotype frequencies	56
4.3.2. Number of alleles	61
4.3.3. Heterozygosity	62
4.3.4. Null alleles	69
4.3.5. Linkage Disequilibrium (LD)	71
4.3.6. Genetic distance	74
4.3.7. Analysis of Molecular Variance (AMOVA)	77
4.3.8. Pairwise F_{ST}	79
4.3.9. Structure analysis	81

CHAPTER FIVE	DISCUSSION	83
CHAPTER SIX	CONCLUSION	94
CHAPTER SEVEN	REFERENCES	96
CHAPTER EIGHT	APPENDICES	
	A: BLAST ANALYSIS	
	B: ALLELE FREQUENCY	
	C: SEQUENCES OF AN ISOLATED FRAGMENT OF <i>Channa striata</i>	