



Hong Truong Luu (Autor)

**Genetic variation and the reproductive system of
Dipterocarpus cf. condorensis Pierre in Vietnam**

Hong Truong Luu



**Genetic variation and
the reproductive system of
Dipterocarpus cf. condorensis Pierre
in Vietnam**



Cuvillier Verlag Göttingen

<https://cuvillier.de/de/shop/publications/2544>

Copyright:

Cuvillier Verlag, Inhaberin Annette Jentzsch-Cuvillier, Nonnenstieg 8, 37075 Göttingen,
Germany

Telefon: +49 (0)551 54724-0, E-Mail: info@cuvillier.de, Website: <https://cuvillier.de>

TABLE OF CONTENTS

List of tables.....	v
List of figures.....	xii
Acknowledgement	xiv
Chapter 1: Introduction	1
1.1. The genetic system of species.....	1
1.2. Genetic variation and genetic structure.....	2
1.3. The mating system	3
1.4. Gene flow.....	4
1.5. Genetic markers	5
1.4.1. Isozymes	6
1.4.2. AFLPs (Amplified Fragment Length Polymorphisms)	8
1.5. The Dipterocarpaceae and their genetic variation	9
1.6. The study species <i>Dipterocarpus cf. condorensis</i> Pierre.....	13
1.7. Objectives of the study.....	18
1.7.1. The genetic structure and variation of <i>D. cf. condorensis</i>	18
1.7.2. The reproduction system of <i>D. cf. condorensis</i>	18
Chapter 2: Material and Methods.....	20
2.1. Material and Sampling design	20
2.2. Laboratory methods	22
2.2.1. Isozymes	22
2.2.2. AFLPs	23
2.3. Data analysis	23
2.3.1. Inheritance study.....	23
2.3.2. Interpretation of AFLP fingerprints.....	24
2.3.3. Characterization of genetic structure and variation	24
2.3.4. Estimation of mating system parameters.....	29
2.3.5. Estimation of parameters of gene flow and neighborhoods	30
2.3.6. Statistical tests	33

Chapter 3: Results and Discussion	35
3.1. Inheritance of isozymes	35
3.1.1. Results	35
3.1.1.1. GOT (glutamate oxaloacetate transaminase, or AAT - aspartate aminotransferase; E.C. 2.6.1.1)	35
3.1.1.2. PGI (phosphoglucose isomerase; E.C. 5.3.1.9)	38
3.1.1.3. LAP (leucine aminopeptidase; E.C. 3.4.11.1)	40
3.1.1.4. MDH (malate dehydrogenase; E.C. 1.1.1.37).....	41
3.1.1.5. 6-PGDH (6-phosphogluconate dehydrogenase; E.C. 1.1.1.44)...	43
3.1.1.6. ADH (alcohol dehydrogenase; E.C. 1.1.1.1)	44
3.1.1.7. IDH (isocitrate dehydrogenase; E.C. 1.1.1.42).....	45
3.1.2. Discussion.....	46
3.2. Interpretation of AFLPs	47
3.3. Genetic structures and genetic variation	47
3.3.1. Results	47
3.3.1.1. Genetic structure	47
Genotypic structure	47
Adult populations	48
Seed populations	48
Allelic structure.....	49
3.3.1.2. Genetic variation within populations	51
Number of alleles per locus and percentage of polymorphic loci at enzyme gene loci	51
Gene diversity of enzyme gene loci in the adult populations	52
Gene diversity of enzyme gene loci in the seed populations	52
Gene diversity of AFLPs within the seed populations	54
Gene diversity of pollen clouds.....	55
3.3.1.3. Genetic differentiation among populations.....	58
Genetic differentiation among the adult populations	59
Genetic differentiation among the seed populations	62
Genetic differentiation among the pooled pollen contributions.....	67
3.3.2. Discussion.....	69
3.3.2.1. Genetic variation within populations	69
Number of alleles per locus and percentage of polymorphic loci.....	69

Gene diversity within the adult and seed populations.....	70
3.3.2.2. Genetic differentiation among populations.....	72
3.3.1.3. Comparison of genetic variation patterns at isozymes and AFLPs	73
3.4. The mating system	74
3.4.1. Results	74
3.4.1.1. Outcrossing rate	74
3.4.1.2. Biparental mating and correlated mating.....	75
3.4.2. Discussion.....	78
3.4.2.1. Outcrossing rate	78
3.4.2.2. Biparental mating and correlated mating.....	80
3.5. Gene flow and effective neighborhoods	82
3.5.1. Results	82
3.5.1.1. Gene flow among populations	82
3.5.1.2. Gene flow within populations.....	83
Heterogeneity of pollen allele frequencies.....	83
Gene flow based on the TwoGener analysis.....	92
Gene flow based on the paternity analysis.....	94
3.5.1.3. The effective pollination neighborhood.....	96
3.5.2. Discussion.....	97
3.5.2.1. The gene flow among the population.....	97
3.5.2.2. Gene flow within populations.....	101
3.5.2.3. The effective pollination neighborhood.....	103
Chapter 4: General discussion and conclusions.....	107
References.....	111
Appendix 1: Distribution of adult trees in the five studied populations	125
Appendix 2: Solutions used for isozyme analyses.....	130
Appendix 3: Genotypic structure of the adult populations	132
Appendix 4: Genotypic structure of the seed populations	134
Appendix 5: Allelic structure of single pollen clouds	136

Appendix 6: Snail diagrams on genetic differentiation among the adult populations at single loci	142
Appendix 7: Snail diagrams on genetic differentiation among the seed populations at single loci	143
Appendix 8: UPGMA tree of <i>Dipterocarpus</i> cf. <i>condorensis</i> seeds based on 72 AFLP loci including four main clusters. Cluster 1 is dominated by seeds from Suoi Nho and Rung Giong, Cluster 3 by seeds from Tram Bon and Ho Linh and Cluster 4 by seeds from Con Dao. Cluster 2 includes seeds from all populations	144
Summary	145
Zusammenfassung.....	151