

Table of Contents

Table of Contents	I
List of Tables.....	IV
List of Figures	VI
Acronyms and Abbreviations.....	VIII
1. General Introduction	1
1.1. Yam: origin and distribution.....	1
1.2. Taxonomy and important features of <i>Dioscorea</i>	2
1.3. Production status and importance of yams	4
1.4. Yams in Ethiopia: an overview.....	6
1.5. Genetic diversity and its importance.....	8
1.6. Rationale of the study	9
1.7. Objectives of the study.....	10
1.8. Thesis outline	11
2. Diversity, Distribution and Management of Yam Landraces (<i>Dioscorea</i> spp.) in Southern Ethiopia.....	13
2.1. Introduction.....	13
2.2. Materials and methods	15
2.2.1. The study area	15
2.2.2. Sampling and data collection	15
2.2.3. Data analysis	17
2.3. Results.....	20
2.3.1. Landrace diversity.....	20
2.3.2. Distribution and abundance of landraces	23
2.3.3. Determinants of diversity	26
2.3.4. The annual cycle of yam cultivation	30
2.4. Discussion	34
2.4.1. Status of yam diversity.....	34
2.4.2. Management and use of diversity	37
2.5. Conclusions.....	38

3. Comparative Analysis of Morphological and Farmers Cognitive Diversity in Yam Landraces (<i>Dioscorea</i> spp.) from Southern Ethiopia	41
3.1. Introduction.....	42
3.2. Materials and methods	44
3.2.1. Agro-morphological characterization	44
3.2.1.1. Plant materials and sampling	44
3.2.1.2. Field planting	45
3.2.1.3. Morphological descriptors	46
3.2.1.4. Data collection, treatment and multivariate analysis	46
3.2.2. Local classification system	47
3.3. Results.....	51
3.3.1. Farmers' classification of yam landraces.....	51
3.3.2. Morphological diversity assessed by cluster analysis.....	55
3.3.3. Morphological diversity assessed by principal components analysis	56
3.4. Discussion	61
3.4.1. Yam diversity recognized by local farmers	61
3.4.2. Patterns of morphological diversity and their correspondence with folks taxonomy.....	64
3.5. Conclusions and future prospects	67
4. Genetic Diversity in Yam Germplasm (<i>Dioscorea</i> spp.) from Ethiopia and their Relatedness to the Main Cultivated <i>Dioscorea</i> Species Assessed by AFLP Markers	69
4.1. Introduction.....	70
4.2. Materials and methods	72
4.2.1. Plant material	72
4.2.2. DNA isolation	73
4.2.3. AFLP analysis	73
4.2.3.1. Restriction-Ligation	73
4.2.3.2. Pre-amplification.....	74
4.2.3.3. Amplification	74
4.2.3.4. Gel electrophoresis.....	75
4.2.4. Data scoring and analysis.....	75
4.3. Results.....	76

4.3.1. AFLP polymorphism.....	76
4.3.2. Genetic diversity within and between groups	77
4.3.3. Phenetic analysis	80
4.4. Discussion	87
4.4.1. Interspecific genetic variability.....	87
4.4.2. Diversity within the accessions from Ethiopia	89
4.4.3. Implications for conservation and improvement.....	91
5. Characterizing Diversity in Composition and Pasting Properties of Tuber Flour in Yam Germplasm (<i>Dioscorea</i> spp.) from Southern Ethiopia	93
5.1. Introduction.....	94
5.2. Materials and methods	96
5.2.1. Plant materials and sample preparation	96
5.2.2. Determination of dry matter content	97
5.2.3. Determination of protein content	97
5.2.4. Determination of starch content	97
5.2.5. Determination of amylose content	98
5.2.6. Measurement of viscosity	99
5.2.7. Statistical analysis	100
5.3. Result	100
5.3.1. Flour composition	100
5.3.2. Pasting properties of yam flour	102
5.3.3. Phenetic analysis	111
5.4. Discussion	115
5.4.1. Variability in chemical composition	115
5.4.2. Diversity in pasting properties of yam flour	117
5.5. Conclusions.....	120
6. Outlook and Conclusions.....	123
Summary	127
Zusammenfassung.....	133
References	137
Curriculum Vitae	153
Acknowledgments	155