
TABLE OF CONTENTS

CHAPTER 1 - INTRODUCTION

1.1.	Introduction	1
1.2.	Origin of Orchidaceae	2
1.3.	Family Orchidaceae	2
1.3.1.	General Morphology	2
1.3.2.	Root	4
1.3.3.	Stem	4
1.3.4.	Leaves	6
1.3.5.	Inflorescence	6
1.3.6.	Flower	7
1.3.7.	Fruit	8
1.3.8.	Seed	9
1.4.	Distinguishing features of Orchidaceae	9
1.5.	Systematic of Orchidaceae	9
1.6.	Threats to Orchids	11
1.7.	Objectives	13
1.8.	References	14

CHAPTER 2 – DIVERSITY AND DISTRIBUTION

2.1.	Introduction	24
2.1.1.	Work on Orchidaceae in India	25
2.1.2.	Orchidaceae in Gujarat	30
2.2.	Study area - Gujarat	33
2.2.1.	Location	33
2.2.2.	Topography and Drainage	33
2.2.3.	Climate and rainfall	35
2.2.4.	Geology and Soil	35
2.2.5.	Forests Types	36
2.3.	Materials and Method	41
2.3.1.	Literature and Herbarium Survey	41

2.3.2.	Field Survey and Photography	41
2.3.3.	Herbarium Preparation and Identification	43
2.3.4.	Status analysis of Orchids at Regional level	44
2.3.5.	<i>Ex-situ</i> Conservation	45
2.4.	Results and Discussion	46
2.4.1.	Diversity and Distribution	46
2.4.2.	Keys and Macromorphological Characters	49
2.4.3.	Host tree Preference	115
2.4.4.	Not located and misinterpreted species	118
2.4.5.	New Records	118
2.4.6.	Status of Orchids	119
2.4.7.	<i>Ex-situ</i> Conservation	120
2.5.	Conclusion	125
2.6.	References	126

CHAPTER 3 – DNA BARCODING

3.1.	Introduction	143
3.1.1.	DNA Barcoding of family Orchidaceae	144
3.2.	Materials and Method	146
3.2.1.	Collection of Plant sample	146
3.2.2.	Chemicals	146
3.2.3.	Isolation of Genomic DNA	147
3.2.4.	PCR Amplification and Sequencing	148
3.2.5.	Sequence Analysis and Submission of Barcodes to BOLD	149
3.3.	Results and Discussion	150
3.3.1.	Assessment and Quantification of Genomic DNA	150
3.3.2.	Amplification and Sequencing Success Rates	152
3.3.3.	Interspecific K2P (Kimura-2-Parameter) Distances and Species Discrimination Rates for three loci	154
3.4.	Conclusion	168
3.5.	References	169

CHAPTER 4 - ANATOMY

4.1.	Introduction	175
4.2.	Review on anatomical studies of orchids	176
4.2.1.	Leaf	176
4.2.2.	Pseudobulb/Stem	179
4.2.3.	Root	179
4.3.	Materials and Method	181
4.3.1.	Sample collection	181
4.3.2.	Killing and Fixation	181
4.3.3.	Microtomy and Staining	181
4.4.	Results and Discussion	182
4.4.1.	General Leaf Anatomy of Orchidaceae	182
4.4.2.	Leaf Anatomy of Orchids	184
4.4.3.	Identification keys	201
4.5.	Conclusion	202
4.6.	References	203

CHAPTER 5 - PHYTOCHEMISTRY

5.1.	Introduction	212
5.2.	Phytochemistry	213
5.2.1.	Classification of Phytochemicals	213
5.2.2.	Phytochemicals of Orchids	217
5.2.3.	Ethnopharmacological Properties of Orchids	221
5.3.	Materials and Method	231
5.3.1.	Plant material	231
5.3.2.	Preparation of plant extracts	231
5.3.3.	Chemicals	231
5.3.4.	HPTLC conditions	232
5.3.5.	HPTLC Fingerprint Profiling	233
5.3.6.	Preliminary Phytochemical analysis using HPTLC	233
5.3.7.	Antioxidant activity	236
5.4.	Results and Discussion	238

5.4.1.	HPTLC Fingerprint Profiling	238
5.4.2.	Preliminary Phytochemical analysis using HPTLC	241
5.4.3.	Antioxidant compounds	263
5.5.	Conclusion	266
5.6.	References	267
