

Contents

<i>List of Contributors</i>	page xi
<i>Foreword</i>	xiii
Ghilleen T. Prance	
<i>Preface</i>	xv
<i>Acknowledgements</i>	xviii
1 Mounting a Fundamental Defence of the Plant Kingdom	1
Stephen Blackmore and Sara Oldfield	
1.1 Introduction	1
1.2 The Anthropocene	1
1.3 Botanic Gardens and Global Change	8
2 Using DNA Sequence Data to Enhance Understanding and Conservation of Plant Diversity at the Species Level	23
Peter M. Hollingsworth, Linda Neaves and Alex D. Twyford	
2.1 The Use of Genetics to Tell Species Apart	23
2.2 Sequencing a Few Loci to Obtain Broad-Brush Patterns: DNA Barcoding	29
2.3 High Resolution Studies on Complex Groups (Sequences from Multiple Nuclear Loci)	35
2.4 Future Prospects for Large-Scale Use of Sequence Data at the Species Level in Plants	40
2.5 Concluding Remarks	41
3 Conservation Assessments and Understanding the Impacts of Threats on Plant Diversity	49
Malin Rivers	
3.1 Habitat Loss	51
3.2 Overexploitation	51

3.3 Invasive Species, Pests and Diseases	54
3.4 Climate Change	56
3.5 Conservation Assessments	58
3.6 The IUCN Red List Categories and Criteria	60
3.7 Influencing Policy and Legislation	68
3.8 Conclusion	69
4 The Role of Botanic Gardens in <i>In Situ</i> Conservation	73
Jin Chen, Richard T. Corlett and Charles H. Cannon	
4.1 Introduction	73
4.2 An Expanded Concept of <i>In Situ</i> Conservation	74
4.3 What Can Botanic Gardens Offer to <i>In Situ</i> Conservation?	78
4.4 How Are Botanic Gardens Best Involved in <i>In Situ</i> Conservation?	79
4.5 Surveys and Inventories	82
4.6 Monitoring of Biodiversity <i>In Situ</i>	85
4.7 Ecological Restoration of Degraded Areas	88
4.8 Assisted Migration in Response to Climatic Change	89
4.9 Ethnobotany and the Sustainable Use of Natural Resources	89
4.10 Set up Partnerships with all Stakeholders	90
4.11 Expanding Impact by Networking	94
4.12 Challenges and Opportunities	95
4.13 Conclusions	97
5 The Role of Botanic Gardens in <i>Ex Situ</i> Conservation	102
Paul Smith and Valerie Pence	
5.1 Introduction: The Range of Plant Diversity Held by Botanic Gardens in their Living Collections	102
5.2 Living Collections	104
5.3 Seed Banks	106
5.4 Exceptional Species	110
5.5 The Strengths and Weaknesses of <i>Ex Situ</i> Collections for Conservation Purposes	120
5.6 Challenges Associated with Maximising the Value of <i>Ex Situ</i> Collections for Conservation	122
5.7 The Conservation Opportunities Afforded by <i>Ex Situ</i> Collections	126

6	The Role of Botanic Gardens and Arboreta in Restoring Plants From Populations to Ecosystems	134
	Kayri Havens	
6.1	Introduction	134
6.2	Types of Restoration Work Undertaken by Botanic Gardens	135
6.3	Overcoming Challenges	149
6.4	Conclusions	158
7	Botanic Gardens and Solutions to Global Challenges	166
	Samuel F. Brockington and Beverley J. Glover	
7.1	Introduction	166
7.2	Global Food Security	166
7.3	The Role of Botanic Gardens in Food Security	168
7.4	Global Fuel Security	177
7.5	Education and Public Awareness of Global Challenges	185
7.6	Conclusions	187
8	Cultivating the Power of Plants to Sustain and Enrich Life	
	How Public Gardens Can Realise our Purpose by Focusing on the Basic Human Needs Universal to Diverse Audiences	192
	Sophia Shaw and Jennifer Schwarz Ballard	
8.1	Reframing 'Community Outreach' as Authentic Engagement	194
8.2	How Can Botanic Gardens Broaden their Reach and Make a Difference?	196
8.3	Conclusion: Change Won't Come Easily, but the Stakes are High and the Benefits Are Well Worth the Effort	199
9	Botanic Gardens and Conservation Impact Options for Evaluation	219
	Sara Oldfield and Valerie Kapos	
9.1	Botanic Gardens: How They Operate and How They Are Perceived	219
9.2	Measuring the Performance of Botanic Gardens	223

9.3 Measuring Conservation Success	226
9.4 Measuring Botanic Garden Progress Towards the Targets of the GSPC	230
10 Conclusions	236
Stephen Blackmore, Sara Oldfield and Paul Smith	
10.1 Key Themes from Chapters	238
10.2 Botanic Gardens and the Future of Plant Conservation	242
<i>Index</i>	249

Colour plates to appear between pp. 142 and 143