

Contents

1	Why Study Inselbergs?	1
	W. Barthlott, S. Porembski	
1.1	Inselbergs – Model Ecosystems for Biodiversity Studies .	1
1.2	Perspectives of Inselberg Research	3
1.3	Linking Inselberg Research to Other Ecosystems	5
	References	6
2	Inselbergs: Geomorphology and Geoecology	7
	H. Bremer, H. Sander	
2.1	Introduction	7
2.2	Diversity of Forms and Terminology	7
2.3	Genesis of Inselbergs	8
2.4	Ayers Rock	18
2.5	Microforms and Substrata – Examples from the Côte d’Ivoire	20
2.6	Discussion	32
	References	34
3	Xeric Islands: Environmental Conditions on Inselbergs	37
	J. Szarzynski	
3.1	Introduction	37
3.2	The Study of Microclimate on Inselbergs in the Côte d’Ivoire	38
3.3	Conclusions	46
	References	47

4	Islands on Islands: Habitats on Inselbergs	49
	S. Porembski, U. Becker, R. Seine	
4.1	Introduction	49
4.2	Habitat Types on Inselbergs	51
4.3	Floristic Affinities to Other Rock Outcrop Ecosystems . .	65
	References	66
5	Algae, Fungi, and Lichens on Inselbergs	69
	B. Büdel, U. Becker, G. Follmann, K. Sterflinger	
5.1	Introduction	69
5.2	Algae	72
5.3	Fungi	75
5.4	Lichens	76
5.5	Habitat Separation	79
5.6	Ecophysiology	83
5.7	Conclusion	87
	References	88
6	Bryophytes	91
	J.-P. Frahm	
6.1	Introduction	91
6.2	Floristic Diversity	92
6.3	Habitats	97
6.4	Structural Adaptations	99
6.5	Dispersal	100
6.6	Distribution	101
6.7	Comparison with Flowering Plants	101
	References	102
7	Vascular Plants on Inselbergs: Systematic Overview . . .	103
	W. Barthlott, S. Porembski	
7.1	Introduction	103
7.2	Data Availability	104
7.3	Systematic Distribution and Species Numbers	104

7.4	Comparison with Vascular Epiphytes	114
References	. . . . .	115
8	Vascular Plants on Inselbergs: Vegetative and Reproductive Strategies	117
	N. Biedinger, S. Porembski, W. Barthlott	
8.1	Introduction	117
8.2	Adaptational Aspects of Plant Life- and Growth-Forms on Inselbergs	117
8.3	Reproductive Strategies	133
8.4	Plant Functional Groups and Redundancy in the Vegetation of Inselbergs	138
References	. . . . .	140
9	Ecophysiology of Vascular Plants on Inselbergs	143
	M. Kluge, J. Brulfert	
9.1	Introduction	143
9.2	Environmental Factors as Stressors	144
9.3	Adaptation of Inselberg Plants to Scarcity of Water	145
9.4	Adaptation of High Irradiance and Temperatures	157
9.5	Adaptation to Deficiency of Mineral Nutrients: Carnivorous Plants	160
9.6	Modes of Photosynthesis in Plants of Mt. Angavokely (Central High Plateau of Madagascar)	161
9.7	Conclusions	168
References	. . . . .	170
10	Variations on One Theme: Regional Floristics of Inselberg Vegetation Authors according to region	
10.1	West African Inselberg Vegetation	177
	S. Porembski	
10.1.1	Geography and Geology	177
10.1.2	Climate	178
10.1.3	Vegetation	179

10.1.4	Inselberg Vegetation	180
10.1.5	Life-Forms and Ecological Adaptations	196
10.1.6	Systematic and Ecological Affinities	199
10.1.7	Phytogeography and Endemism	203
	References	208
10.2	East and Southeast Africa	213
	R. Seine, U. Becker	
10.2.1	Geography and Geology	213
10.2.2	Climate	213
10.2.3	Vegetation	214
10.2.4	Inselberg Vegetation	216
10.2.5	Life-Forms	228
10.2.6	Vegetative Adaptations	228
10.2.7	Reproductive Adaptations	230
10.2.8	Systematic and Ecological Characteristics	230
10.2.9	Biogeography, Endemism, and Speciation	232
	References	234
10.3	The Arid Scenario: Inselbergs in the Namib Desert Are Rich Oases in a Poor Matrix (Namibia and South Africa)	237
	N. Jürgens, A. Burke	
10.3.1	Geography and Geology	237
10.3.2	Geomorphological Features	238
10.3.3	Soils	241
10.3.4	Climate	242
10.3.5	Flora, Vegetation, and Life-Forms	243
10.3.6	Human Impact and Conservation	255
10.3.7	Research Needs	256
	References	257
10.4	Vegetation of Malagasy Inselbergs	259
	E. Fischer, I. Theisen	
10.4.1	Introduction	259
10.4.2	Geography and Geology	259

Contents	XXV
10.4.3 Climate	261
10.4.4 Vegetation	261
10.4.5 Inselberg Vegetation	263
10.4.6 Systematic Characteristics	268
10.4.7 Life-Forms and Adaptations	269
10.4.8 Biogeography and Endemism	271
10.4.9 Considerations upon Diversity	274
References	274
 10.5 Seychelles	 277
N. Biedinger, K. Fleischmann	
10.5.1 Introduction	277
10.5.2 Geography and Geology	277
10.5.3 Climate	278
10.5.4 Vegetation of the Granitic Islands	279
10.5.5 Inselberg Vegetation	280
10.5.6 Life-Forms and Adaptations	283
10.5.7 Systematic and Ecological Characteristics	285
10.5.8 Biogeography and Endemism	286
10.5.9 Conservation	287
References	288
 10.6 Flora and Vegetation of Inselbergs of Venezuelan Guayana	 291
A. Gröger	
10.6.1 Geography and Geology	291
10.6.2 Climate	291
10.6.3 Vegetation of Venezuela	293
10.6.4 Inselberg Vegetation	295
10.6.5 Life-Forms and Adaptations	299
10.6.6 Systematic Characteristics	302
10.6.7 Biogeography and Endemism	304
10.6.8 Appendix	309
References	312

10.7	The Guianas (Guyana, Suriname, French Guiana)	315
	U. P. D. Raghoenandan	
10.7.1	Introduction	315
10.7.2	Geography and Geology	315
10.7.3	Climate	318
10.7.4	Vegetation of the Guianas	319
10.7.5	Inselberg Vegetation	320
10.7.6	Life-Forms and Adaptations	327
10.7.7	Systematic and Ecological Characteristics	328
10.7.8	Biogeography and Endemism	334
10.7.9	Conclusion	335
	References	336
10.8	Southeast Brazil	339
	H. D. Safford, G. Martinelli	
10.8.1	Introduction	339
10.8.2	Geography	340
10.8.3	Geology and Palaeoclimatology	343
10.8.4	Modern Climate	345
10.8.5	Vegetation of Southeastern Brazil	347
10.8.6	Inselberg Vegetation of Southeastern Brazil	352
10.8.7	Life-Forms and Adaptations	358
10.8.8	Systematics	362
10.8.9	Biogeography and Endemism	380
10.8.10	Summary	384
10.8.11	Postscript	385
	References	385
10.9	Floristics of Australian Granitoid	
	Inselberg Vegetation	391
	S. D. Hopper	
10.9.1	Introduction	391
10.9.2	Geography and Geology	392
10.9.3	Flora, Climate, and Vegetation	392
10.9.4	Inselberg Vegetation – Life-Forms, Adaptations, Systematics	394
10.9.5	Biogeography, Endemism, and Speciation	400

10.9.6	Biodiversity of Australian Inselbergs	404
References	. . . . .	404
10.10	Flora and Vegetation of Granite Outcrops in the Southeastern United States	409
	R. Wyatt, J. R. Allison	
10.10.1	Geography and Geology	409
10.10.2	Climate	412
10.10.3	Zonal Vegetation	415
10.10.4	Inselberg Vegetation	416
10.10.5	Life-Forms and Adaptations	419
10.10.6	Systematic and Ecological Characteristics	421
10.10.7	Biogeography and Endemism/Speciation	423
10.10.8	Appendix	428
References	. . . . .	430
11	Phytogeography	435
	R. Seine, S. Porembski, U. Becker	
11.1	Introduction	435
11.2	Systematic Composition of Inselberg Florulae	435
11.3	General Tendencies in Distribution Patterns	437
11.4	Endemism	441
11.5	Influence of Regional Diversity	441
11.6	Influence of Paleogeography and Paleoclimate	443
11.7	Speciation	444
11.8	Exotics and Weeds	445
References	. . . . .	448
12	Factors Controlling Species Richness of Inselbergs	451
	S. Porembski, R. Seine, W. Barthlott	
12.1	Introduction	451
12.2	Species Richness of Inselbergs: the Relationship Between Local and Regional Diversity	453
12.3	Species Richness, Size, and Isolation of Inselbergs	457
12.4	Species Richness: Diversity Patterns on Inselbergs	462

12.5 Species Richness of Inselbergs: Coexistence
 of Equilibrium and Nonequilibrium Communities 464

12.6 Conclusions 475

References 478

13 The Fauna of Inselbergs 483
 M. A. Mares, R. H. Seine

13.1 Introduction 483

13.2 How Inselbergs Influence Faunal Development 484

13.3 Appendix: Animal Species Closely Associated
 with Inselbergs 487

References 490

14 Human Dimensions and Conservation 493
 R. Seine

14.1 Introduction 493

14.2 Cultural Aspects 493

14.3 Human Impact 499

14.4 Genetic Resources 500

14.5 Proposals for Conservation and Sustainable Use 501

14.6 Appendix 502

References 505

**15 Biodiversity of Terrestrial Habitat Islands –
 the Inselberg Evidence 507**
 S. Porembski

15.1 Introduction 507

15.2 Inselbergs – an Old and
 Environmentally Harsh Ecosystem 507

15.3 The Importance of Cryptogams on Inselbergs 509

15.4 Adaptive Traits Towards Life on Inselbergs 509

15.5 Phytogeographical Aspects 511

15.6 Species Richness of Inselberg Plant Communities 511

References 513

Subject Index 515

Species Index 519

Inselbergs

Biotic Diversity of Isolated Rock Outcrops in Tropical
and Temperate Regions

Porembski, S.; Barthlott, W. (Eds.)

2000, XXXII, 524 p. 15 illus. in color., Hardcover

ISBN: 978-3-540-67269-2