
Contents

Introduction	1
<i>John Dighton, James F. White, Jr., and Peter Oudemans</i>	

SECTION 1 Structure of Fungal Communities

1	Linking Function between Scales of Resolution	13
	<i>Sherri J. Morris and G. Philip Robertson</i>	
2	Fungal Communities: Their Diversity and Distribution	27
	<i>David L. Hawksworth and Gregory M. Mueller</i>	
3	Freshwater Fungal Communities	39
	<i>Felix Bärlocher</i>	
4	Marine Fungal Communities	61
	<i>Tamar Kis-Papo</i>	
5	Tropical Fungi	93
	<i>Kevin D. Hyde, Lei Cai, and Rajesh Jeewon</i>	
6	Lichens and Microfungi in Biological Soil Crusts: Community Structure, Physiology, and Ecological Functions	117
	<i>Jayne Belnap and Otto L. Lange</i>	
7	Mycorrhizal Fungi in Successional Environments: A Community Assembly Model Incorporating Host Plant, Environmental, and Biotic Filters	139
	<i>Ari Jumpponen and Louise M. Egerton-Warburton</i>	
8	Fungal Communities: Relation to Resource Succession	169
	<i>Jean-François Ponge</i>	

9	Emerging Perspectives on the Ecological Roles of Endophytic Fungi in Tropical Plants	181
	<i>Sunshine A. Van Bael, Zuleyka Maynard, Enith Rojas, Luis C. Mejia, Damond A. Kylo, Edward A. Herre, Nancy Robbins, Joseph F. Bischoff, and Ann E. Arnold</i>	
10	Classical Methods and Modern Analysis for Studying Fungal Diversity	193
	<i>John Paul Schmit and D. Jean Lodge</i>	
11	Fungal Diversity in Molecular Terms: Profiling, Identification, and Quantification in the Environment	215
	<i>Martin I. Bidartondo and Monique Gardes</i>	
12	Analytical and Experimental Methods for Estimating Population Genetic Structure of Fungi	241
	<i>Jiasui Zhan and Bruce A. McDonald</i>	
13	Interspecific Interaction Terminology: From Mycology to General Ecology	265
	<i>Amy R. Tuininga</i>	
SECTION 2 Function of Fungal Communities		
14	Fungal Activity as Determined by Microscale Methods with Special Emphasis on Interactions with Heavy Metals	287
	<i>Katarzyna Turnau and Ingrid Kottke</i>	
15	Exploring Fungal Activity with Confocal and Multiphoton Microscopy	307
	<i>Kirk J. Czymmek</i>	
16	Enzymatic Activities of Mycelia in Mycorrhizal Fungal Communities	331
	<i>Björn D. Lindahl, Roger D. Finlay, and John W.G. Cairney</i>	
17	Fungal Enzymes at the Community Scale	349
	<i>Robert L. Sinsabaugh</i>	
18	Using Isotopic Tracers to Follow Carbon and Nitrogen Cycling of Fungi	361
	<i>Erik A. Hobbie</i>	
19	Diversity-Functioning Relationships in Ectomycorrhizal Fungal Communities	383
	<i>James W. Baxter and John Dighton</i>	
20	Fungi, Bacteria, and Viruses as Pathogens of the Fungal Community	399
	<i>Donald Y. Kobayashi and Bradley I. Hillman</i>	
21	Fungal Endophytes in Terrestrial Communities and Ecosystems	423
	<i>Jennifer A. Rudgers and Keith Clay</i>	

22	Mechanisms of Arbuscular Mycorrhizal Mediation of Plant-Plant Interactions <i>James D. Bever and Peggy A. Schultz</i>	443
23	Impacts of Plant Pathogenic Fungi on Plant Communities <i>Everett M. Hansen and Jeffrey K. Stone</i>	461
24	The <i>Epichloë</i> Endophytes of Grasses and the Symbiotic Continuum <i>Christopher L. Schardl and Adrian Leuchtmann</i>	475
25	Evolutionary Development of the Clavicipitaceae <i>Joseph F. Bischoff and James F. White, Jr.</i>	505
26	Ecological Fitness Factors for Fungi within the Balansieae and Clavicipiteae <i>Charles W. Bacon and Philip Lyons</i>	519
27	Fungal Communities of Seaweeds <i>Alga Zuccaro and Julian I. Mitchell</i>	533
28	Trophic Interactions of Fungi and Animals <i>Liliane Ruess and John Lussenhop</i>	581
29	Sporocarp Mycophagy: Nutritional, Behavioral, Evolutionary, and Physiological Aspects <i>Andrew W. Claridge and James M. Trappe</i>	599
30	Hypogeous Fungi: Evolution of Reproductive and Dispersal Strategies through Interactions with Animals and Mycorrhizal Plants <i>James M. Trappe and Andrew W. Claridge</i>	613
SECTION 3 Human Impacts on Fungal Communities and Their Function		
31	Human Impacts on Biodiversity and Ecosystem Services: An Overview <i>Michael J. Swift</i>	627
32	Oligotrophic Growth of Fungi <i>Milton Wainwright</i>	643
33	Fungal Communities of Desert Ecosystems: Links to Climate Change <i>John Zak</i>	659
34	Symbiotic Lifestyle Expression by Fungal Endophytes and the Adaptation of Plants to Stress: Unraveling the Complexities of Intimacy <i>Russell J. Rodriguez, Regina S. Redman, and Joan M. Henson</i>	683
35	Biological Soil Crusts and Global Changes: What Does the Future Hold? <i>Jayne Belnap and Otto L. Lange</i>	697

36	Nutrient Acquisition Strategies of Fungi and Their Relation to Elevated Atmospheric CO ₂ <i>Kathleen K. Treseder</i>	713
37	Toxic Metals and Fungal Communities <i>Marina Fomina, Euan P. Burford, and Geoffrey M. Gadd</i>	733
38	Radionuclides and Fungal Communities <i>Nelli N. Zhdanova, Valentina A. Zakharchenko, and Kurt Haselwandter</i>	759
39	How Do Composition, Structure, and Function of Mycorrhizal Fungal Communities Respond to Nitrogen Deposition and Ozone Exposure? <i>Erik A. Lilleskov</i>	769
40	Micromycete Associations in the Rhizosphere of Steppe and Agrophytocenose Plants <i>Erast Golovko and Nataliya Ellanska</i>	803
41	Fungal Communities of Agroecosystems <i>Mary E. Stromberger</i>	813
42	Effects of Forest Management on Fungal Communities <i>Daniel M. Durall, Melanie D. Jones, and Kathy J. Lewis</i>	833
43	Exotic Species and Fungi: Interactions with Fungal, Plant, and Animal Communities <i>David M. Rizzo</i>	857
SECTION 4 Preserving Fungal Communities		
44	Fungal Conservation: Some Impressions — A Personal View <i>Roy Watling</i>	881
	Species Index	897
	Subject Index	911