

Contents

Part I Boundary Conditions for Microbial Life at Low Temperatures

- 1 The Climate of Snow and Ice as Boundary Condition for Microbial Life. 3**
Michael Kuhn
- 2 Limits for Microbial Life at Subzero Temperatures. 17**
Corien Bakermans

Part II Microbial Diversity in Cold Ecosystems

- 3 Bacteria in Snow and Glacier Ice 31**
Vanya Miteva
- 4 Bacteria in Subglacial Environments. 51**
Brent C. Christner, Mark L. Skidmore, John C. Priscu,
Martyn Tranter, and Christine M. Foreman
- 5 Bacteria in the Deep Sea: Psychropiezophiles. 73**
Yuichi Nogi
- 6 Bacteria in Permafrost. 83**
David Gilichinsky, Tatiana Vishnivetskaya, Mayya Petrova,
Elena Spirina, Vladimir Mamykin, and Elizaveta Rivkina
- 7 Anaerobic Bacteria and Archaea in Cold Ecosystems 103**
Kai Finster
- 8 Cyanobacteria in Cold Ecosystems 121**
Frédéric Zakhia, Anne-Dorothee Jungblut, Arnaud Taton,
Warwick F. Vincent, and Annick Wilmotte

9	Fungi in Cold Ecosystems	137
	Jens C. Frisvad	
10	Cold-Active Viruses	157
	Llyd E. Wells	
Part III Molecular Adaptations to Cold Habitats		
11	Membrane Components and Cold Sensing	177
	Nicholas J. Russell	
12	Cold-Shock Proteins	191
	Sangita Phadtare and Masayori Inouye	
13	Fundamentals of Cold-Adapted Enzymes	211
	Tony Collins, Frédéric Roulling, Florence Piette, Jean-Claude Marx, Georges Feller, Charles Gerday, and Salvino D'Amico	
14	Cryoprotectants and Ice-Binding Proteins	229
	Hidehisa Kawahara	
15	The Role of Exopolymers in Microbial Adaptation to Sea Ice	247
	Christopher Krembs and Jody W. Deming	
16	Genomic Analysis of Psychrophilic Prokaryotes	265
	John P. Bowman	
17	Microalgae in Polar Regions: Linking Functional Genomics and Physiology with Environmental Conditions	285
	Thomas Mock and David N. Thomas	
18	Metagenomics: Microbial Community Genomes Revealed	313
	Sara Sjöling and Don A. Cowan	
19	Proteomic Studies of Psychrophilic Microorganisms	333
	Tatsuo Kurihara and Nobuyoshi Esaki	
Part IV Biotechnological Aspects		
20	Biotechnological Aspects of Cold-Adapted Enzymes	347
	Adrienne L. Huston	

21	Heterologous Protein Expression in Psychrophilic Hosts	365
	Ermenegilda Parrilli, Angela Duilio, and Maria Luisa Tutino	
22	Cold-Adapted Fungi as a Source for Valuable Metabolites	381
	Jens C. Frisvad	
23	Natural and Stimulated Biodegradation of Petroleum in Cold Marine Environments	389
	Odd Gunnar Brakstad	
24	Microbial Adaptation to Boreal Saturated Subsurface: Implications in Bioremediation of Polychlorophenols	409
	Jörg H. Langwaldt, Marja Tirola, and Jaakko A. Puhakka	
25	Biological Iron Oxidation and Sulfate Reduction in the Treatment of Acid Mine Drainage at Low Temperatures	429
	Anna H. Kaksonen, Mark Dopson, Olia Karnachuk, Olli H. Tuovinen, and Jaakko A. Puhakka	
	Index	455

Psychrophiles: From Biodiversity to Biotechnology

Margesin, R.; Schinner, F.; Marx, J.-C.; Gerday, C. (Eds.)

2008, XVI, 462 p. 72 illus., 6 illus. in color., Hardcover

ISBN: 978-3-540-74334-7