

TABLE OF CONTENTS

Foreword Joseph Seckbach	xi
Introduction Nina Gunde-Cimerman, Aharon Oren and Ana Plemenitaš	1
Section I. The environments and their diversity	7
Microbial diversity of Great Salt Lake Bonnie K. Baxter, Carol D. Litchfield, Kevin Sowers, Jack D. Griffith, Priya Arora DasSarma and Shiladitya DasSarma	9
Microbial communities in the Dead Sea – past, present and future Aharon Oren, Ittai Gavrieli, Jonah Gavrieli, Marco Kohen, Joseph Lati and Mordehay Aharoni	27
Microscopic examination of microbial communities along a salinity gradient in saltern evaporation ponds: a ‘halophilic safari’ Aharon Oren	41
The microbial diversity of a solar saltern on San Francisco Bay Carol D. Litchfield, Masoumeh Sikaroodi and Patrick M. Gillivet	59
Diversity of microbial communities: the case of solar salterns Carlos Pedrós-Alió	71
Isolation of viable haloarchaea from ancient salt deposits and application of fluorescent stains for <i>in situ</i> detection of halophiles in hypersaline environmental samples and model fluid inclusions Stefan Leuko, Andrea Legat, Sergiu Fendrihan, Heidi Wieland, Christian Radax, Claudia Gruber, Marion Pfaffenhuemer, Gerhard Weidler and Helga Stan-Lotter	91

Hydrocarbon degradation under hypersaline conditions. Some facts, some experiments and many open questions Heiko Patzelt	105
The relevance of halophiles and other extremophiles to Martian and extraterrestrial environments Joseph Seckbach	123
Halophiles: a terrestrial analog for life in brines on Mars – Halophiles on Mars Rocco L. Mancinelli	137
Section II. Archaea	149
Comparative genomic survey of information transfer systems in two diverse extremely halophilic Archaea, <i>Halobacterium</i> sp. strain NRC-1 and <i>Haloarcula marismortui</i> Brian R. Berquist, Jeetendra Soneja and Shiladitya DasSarma	151
Walsby's square archaeon; it's hip to be square but even more hip to be culturable Henk Bolhuis	185
Gene regulation and the initiation of translation in halophilic Archaea Felicitas Pfeifer, Peter Zimmermann, Sandra Scheuch and Simone Sartorius-Neef	201
Protein translation, targeting and translocation in <i>Haloferax volcanii</i> Jerry Eichler, Gabriela Ring, Vered Irihimovitch, Tovit Lichi, Irit Tozik and Zvia Konrad	217
Enzymes of halophilic Archaea. Recent findings on ureases and nucleoside diphosphate kinases Toru Mizuki, Ron Usami, Masayuki Kamo, Masaru Tanokura and Masahiro Kamekura	227

Osmoadaptation in methanogenic Archaea: recent insights from a genomic perspective Katharina Pflüger, Heidi Wieland and Volker Müller	239
Section III. Bacteria	253
<i>Salinibacter ruber</i> : genomics and biogeography Josefa Antón, Arantxa Peña, Maria Valens, Fernando Santos, Frank-Oliver Glöckner, Margarete Bauer, Joaquín Dopazo, Javier Herrero, Ramon Rosselló-Mora and Rudolf Amann	255
What we can deduce about metabolism in the moderate halophile <i>Chromohalobacter salexigens</i> from its genomic sequence Laszlo N. Csonka, Kathleen O'Connor, Frank Larimer, Paul Richardson, Alla Lapidus, Adam D. Ewing, Bradley W. Goodner and Aharon Oren	267
K ⁺ transport and its role for osmoregulation in a halophilic member of the <i>Bacteria</i> domain: characterization of the K ⁺ uptake systems from <i>Halomonas elongata</i> Hans-Jörg Kunte	287
The chloride regulon of <i>Halobacillus halophilus</i> : a novel regulatory network for salt perception and signal transduction in bacteria Volker Müller and Stephan H. Saum	301
Biosynthesis of the compatible solute mannosylglycerate from hyperthermophiles to mesophiles. Genes, enzymes and evolutionary perspectives Milton S. da Costa and Nuno Empadinhas	311
Genes and enzymes of ectoine biosynthesis in the haloalkaliphilic obligate methanotroph "Methylomicrobium alcaliphilum 20Z" Alexander S. Reshetnikov, Valentina N. Khmelenina, Ildar I. Mustakhimov, Yana V. Ryzhmanova and Yuri A. Trotsenko	327

Halophilic Archaea and Bacteria as a source of extracellular hydrolytic enzymes	
Antonio Ventosa, Cristina Sánchez-Porro, Sara Martín and Encarnación Mellado	337
Biopolyester production: halophilic microorganisms as an attractive source	
Jorge Quillaguamán, Bo Mattiasson and Rajni Hatti-Kaul	355
Section IV. Fungi	369
Relation of halotolerance to human pathogenicity in the fungal tree of life: an overview of ecology and evolution under stress	
G. Sybren de Hoog, Polona Zalar, Bert Gerrits van den Ende and Nina Gunde-Cimerman	371
Halotolerant and halophilic fungi from coastal environments in the Arctic	
Nina Gunde-Cimerman, Lorena Butinar, Silva Sonjak, Martina Turk, Viktor Uršič, Polona Zalar and Ana Plemenitaš	397
Halotolerant and halophilic fungi and their extracellular production	
Jens C. Frisvad	425
Introducing <i>Debaryomyces hansenii</i> , a salt-loving yeast	
José Ramos	441
Cellular responses in the halophilic black yeast <i>Hortaea werneckii</i> to high environmental salinity	
Ana Plemenitaš and Nina Gunde-Cimerman	453
Halotolerance and lichen symbioses	
Martin Grube and Julianne Blaha	471
Section V. Algae	489
A century of <i>Dunaliella</i> research: 1905-2005	
Aharon Oren	491

Molecular determinants of protein halotolerance: structural and functional studies of the extremely salt tolerant carbonic anhydrases from <i>Dunaliella salina</i> Lakshmane Premkumar, Michal Volkovitsky, Irena Gokhman, Joel L. Sussman and Ada Zamir	503
Section VI. Protozoa	517
Heterotrophic protozoa from hypersaline environments Gwen Hauer and Andrew Rogerson	519
Heterotrophic flagellates in hypersaline waters Byung C. Cho	541
Section VII. Viruses	551
Haloviruses and their hosts Mike L. Dyall-Smith, David G. Burns, Helen M. Camakaris, Peter H. Janssen, Brendan E. Russ and Kate Porter	553
Subject Index	565
Organism Index	569
Author Index	575