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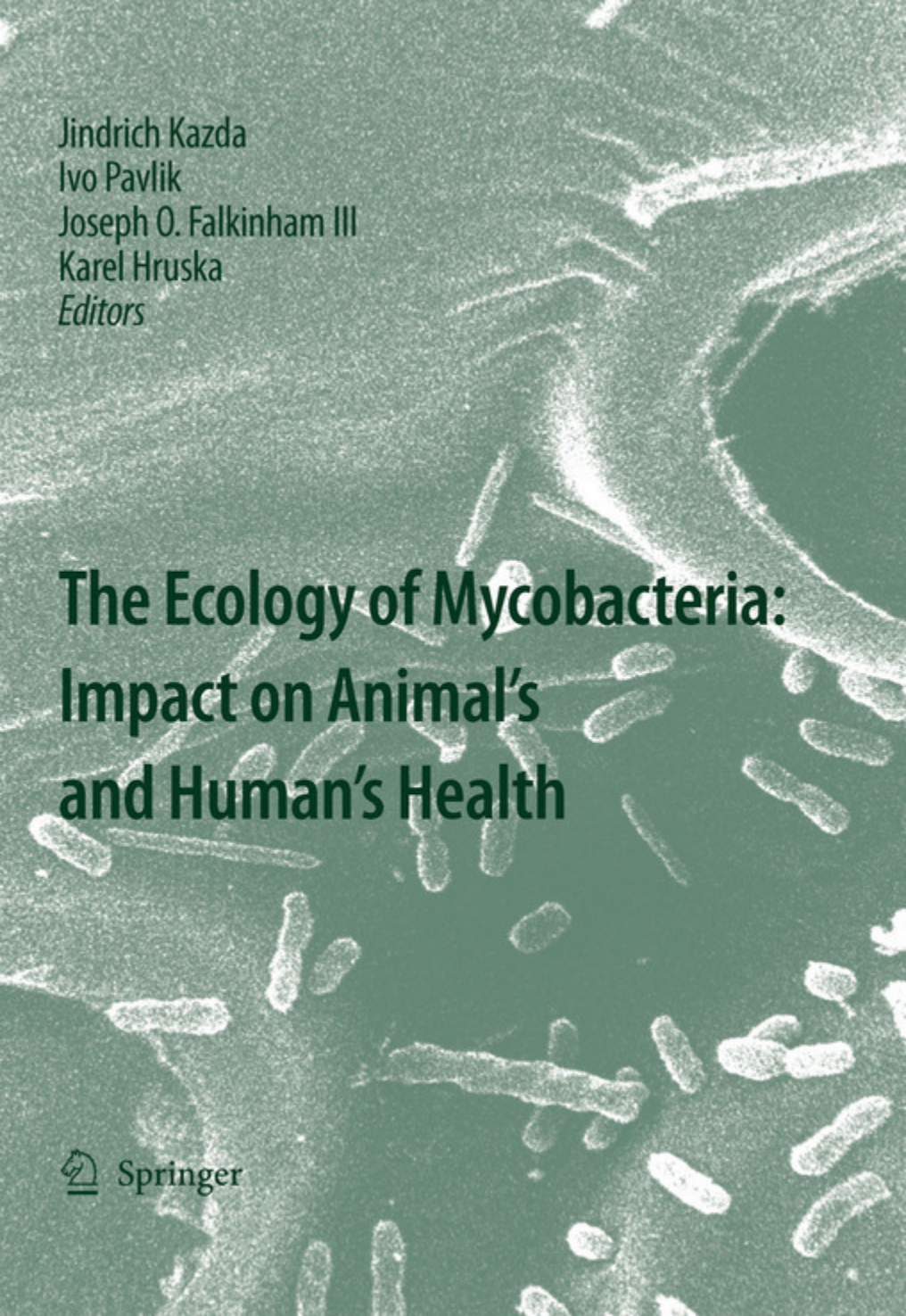

Springer

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Cover image: Mycobacteria (slightly bent, short rods) on the surface of hyalocytes in the grey layer of Sphognum magellanicum (Photo K. Muller)

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Preface to the Second Edition

A decade has passed since the primary literature sources were collected and the first edition of this book written. This period of time seems to be relatively short when one considers that mycobacteria were first reported 100 years ago. On the other hand, the known range of mycobacteria has been greatly extended in recent years. The introduction of molecular biology methods has brought about a remarkable burst in the description of new species. While about 70 mycobacterial species were registered at the time of the first edition, more than 130 of them are known at present. With the discovery of new mycobacterial species, the cases of human and animal immunocompetent and immunosuppressed hosts and the isolation of mycobacteria with the enzymatic potential to cause the degradation of aliphatic organic substances are increasing in numbers almost as rapidly.

In order to be able to cover all of the most significant mycobacterial species, it was necessary to consider the ecology of mycobacteria as a discipline that would not only include the external environment but also the occurrence of mycobacteria in animal and human organisms, where interaction occurs. The environment is neither non-living nor static, but the very opposite. It undergoes periodic and other changes (seasons of the year, changing biotic and abiotic factors), while animal and human organisms have the static tendency towards a status *quo ante*. The classification of mycobacteria into respective disciplines such as epidemiology, epizootiology, immunology and environmental ecology did not contribute to a comprehensive understanding of their significance. Therefore, in this book mycobacteria are presented as a whole, under the general designation of mycobacterial ecology, and without limitation by any particular discipline.

This enabled us to concentrate our attention on the genus *Mycobacterium* in all kinds of environments in which they can live, i.e. in macro-organisms as well as in nature. Special attention was paid to the conditions under which mycobacteria can survive, multiply or exist in a dormant state. Of more than 100 species only a few are obligate pathogens for humans and animals. These are unable to grow in the natural environment, but have developed special strategies for reaching susceptible individuals. Furthermore, potentially pathogenic mycobacteria possess the ability both to multiply in natural environments and to cause diseases. A transitional phenomenon creates mycobacterial species that live in the environment and provoke allergic reactions in animals. The majority of mycobacteria are saprophytic and some of them serve as nutrients for dragonfly larvae.

The phylogeny of mycobacteria indicates that pathogenic species developed from saprophytic ones. There is evidence to suggest that the disturbance of their natural

habitats and the overlapping of these biotopes by humans and animals contributed to the spread of mycobacteria and perhaps to their convergence to pathogenicity.

It was not our intention to present a compendium covering all published results, but rather to issue a “readable” book, which is illustrative and thus focused on the principle facts. The increase in the number of Editors has allowed the sharing of original experiences regarding the ecology of mycobacteria, published here for the first time in some cases. The supplemented edition should serve as a guide to these discoveries and also contribute to an understanding of clinically significant species in human and animal medicine.

Borstel, Germany, January 2009 Jindrich Kazda

Editors' Comments

The editors responsible for the chapters are listed under the title of each chapter. Authors are listed under the titles of subchapters.

The references are listed as they appear in the databases Reference Manager (Thomson Reuters, Philadelphia) as imported from Web of Science (Thomson Reuters, Philadelphia) or PubMed (Medline, NLM Bethesda). A few citations, not indexed, were cited according to the reprints or books available. This principle resulted in minor differences in the titles (not all reference titles are in English, some references have capitalized title words, not all species names are according to the contemporary nomenclature and in italics). Some journals are cited with abbreviated titles, some in full, as available in the source databases. These differences were left in the format of the database.

All photos are collected in Chapter 10, with references to the chapter and subchapter where they are quoted.

To keep the structure of the book some information appears in two or more chapters with respect to the chapter's main field. Readers should not consider this as a duplicity.

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Abbreviations

AFB	acid-fast bacilli, acid-fast bacteria
AFLP	amplified fragment length polymorphism
AFR	acid-fast rods
AIDS	Acquired Immunodeficiency Syndrome
ATCC	The American Type Culture Collection
ATP	adenosine triphosphate
BCG	Bacillus Calmette-Guérin or Bacille Calmette-Guérin
BTEX	aromatic hydrocarbons benzene, toluene, ethyltoluene and xylene
CD	Crohn's disease
CFU	colony forming units
CNS	central nervous system
C/N	carbon and nitrogen ratio
CFTR	cystic fibrosis transmembrane conductance regulator
DGGE	denaturing gradient gel electrophoresis
DNA	deoxyribonucleic acid
ESD	endosulfan-degrading
ESM	environmental saprophytic mycobacteria
GC-MS	gas chromatography-mass spectrometry
HIV	human immunodeficiency virus
HP	hypersensitivity pneumonitis
HPLC	high-performance liquid chromatography or high pressure liquid chromatography
M.	*Mycobacterium*
MAC	*M. avium* complex
MAI	*M. avium-intracellulare*
MAIC	*M. avium-intracellulare* complex
MAIS	*M. avium-intracellulare-scrofulaceum* complex
MDT	multi drug therapy
MDP	muramyl dipeptide
MPTR	major polymorphic tandem repeat
MTC	*Mycobacterium tuberculosis* complex

MWF	metal-working fluid
NC AFB	non-cultivable acid-fast bacilli
NCTC	National Collection of Type Cultures
NTM	non-tuberculous mycobacteria
NOD	nucleotide-binding oligomerisation domain
OIE	World Organisation for Animal Health
OPM	obligate pathogenic mycobacteria
PAHs	polycyclic aromatic hydrocarbons
PCR	polymerase chain reaction
PFGE	pulsed field gel electrophoresis
PGL	phenolic glycolipid
PGPR	plant growth-promoting bacteria
PPM	potentially pathogenic mycobacteria
PVC	polyvinylchloride
R.	*Rhodococcus*
rDNA	ribosomal DNA
rRNA	ribosomal RNA
RNA	ribonucleic acid
***rep*-PCR**	repetitive-unit-sequence-based PCR
RFLP	restriction fragment length polymorphism
SIV	simian immunodeficiency virus
TCE	trichloroethylene
TLR	toll-like receptor
TMC	Trudeau Mycobacterial Culture Collection
TNF-α	tumor necrosis factor alfa
USA	United States of America
UK	United Kingdom
US EPA	United States Environmental Protection Agency
UV	ultraviolet
WHO	World Health Organization