

# Preface to Third Edition

When starting our work on this book we intended to summarize and synthesize the new information that had developed in the past 20–30 years in the field of plant litter decomposition. It turned out, however, that the main part of more recent work was directed toward boreal and temperate forest systems and therefore, with a focus on these ecosystems we finally concluded a synthesis that has a similarity to a case study. Still, we hope that a deeper insight into the behavior of a limited number of litter species will be of value for a generalization and also for the identification of process systems that deviate from those presented here.

We have written the book focusing on the transfer from newly shed litter to recalcitrant humus, describing and explaining the system of chemical changes taking place in the process both on a mechanistic basis and on a more general and regional level, considering different climates and species.

As a synthesis, this book gives some new aspects on decomposition that to some may be controversial. Thus, the fact that we emphasize the dominant role of microorganisms in the process may be disturbing to many readers, as well as the strong emphasis we give to the fact that humus layers actually do grow over millennia and that at a considerable rate, and thus really sequester, e.g., C and N.

This book is based primarily on data and conclusions made from field studies. We have focused on undisturbed forest systems in an attempt to create a basic understanding and basic mechanisms for the decomposition and transformation processes. Its emphasis is on boreal systems for the obvious reason that there appeared to exist more data about these systems that could be synthesized. The information from temperate systems has rather supported and extended the conclusions, suggesting that the synthesis so far may be applicable to at least both types of systems.

In the topic of litter decomposition and transformations, we can not yet identify different schools of thought; it appears that this field of research has not yet developed far enough. We would rather consider different directions of the research work. Thus, some scientists have attempted to understand mechanisms for the degradation whereas several groups have searched for indices for prediction of long-term decomposition rates.

The synthesis that we present has clearly taken impression of the work by a smaller group of scientists and research groups that we want to mention. Thus, the papers emerging from the group around Dr. Marie-Madeleine Couteaux, CNRS, Montpellier has been important to us, like those from Prof. John Aber, University of New Hampshire, and Dr. Jerry Melillo, The Ecosystems Center, MBL, Woods Hole.

Many other persons have been helpful in the process of collecting and developing the information that makes up the backbone for this book. We want to thank all of them and hope they understand that all cannot be listed here.

New and valuable data have appeared from the large US project Long-Term Intersite Decomposition Experiment Team (LIDET) and from the Canadian Intersite Decomposition Experiment (CIDET). The new analytical methods using  $^{13}\text{C}$ -NMR for determining organic compounds in decomposing litter, developed in Canada, Italy, and Japan have provided us with new insights and may change older theories about the process of litter decomposition.

For the first edition the support of the Brumbaugh Center for Environmental Science, University of Mount Union, Alliance, Ohio is also gratefully acknowledged. Good and substantial financial support from the BITÖK institute, University of Bayreuth, Germany and from the Commission of the European Union, through the CINTER project (QLK5-2001-00596) is acknowledged.

For the second and third editions we have used much of the data and the views on regionalization to different climates that have been developed by Prof. Vernon Meentemeyer, University of Georgia, Athens, have been extremely valuable. Likewise, the recent papers of Dr. Chunjiang Liu, School of Agriculture and Biology, Shanghai Jiao Tong University and Key Laboratory of Urban Agriculture (South), Ministry of Agriculture, Shanghai have contributed to the synthesis.

We have been allowed to use unpublished data and express our thanks to Drs. Cecilia Akselsson, Maj-Britt Johansson, Anna Hagen-Thorn, Per Gundersen and Åke Nilsson. We also want to thank Prof. Egbert Matzner, BITÖK, University of Bayreuth, Prof. Carl-Johan Westman, Department of Forest Ecology, University of Helsinki and Prof. Amalia Virzo De Santo, Dipartimento Biologia Strutturale e Funzionale, University of Naples Federico II, for their extensive support for this book.

Now when the third edition has been finished we want to express our appreciation of the valuable help and support we have received. Finally, before handing over this book to the reader we would like to once again thank each other for an excellent cooperation.

Uppsala and Helsinki, April 2013

Alliance

A stylized, handwritten signature in black ink, consisting of a large, flowing 'B' followed by a smaller, more compact 'B'.

Björn Berg

A handwritten signature in black ink, written in a cursive style that reads 'Chuck McClaugherty'.

Charles McClaugherty

## Preface to Second Edition

When starting our work on this book we intended to summarize and synthesize the new information that had developed in the last 20-30 years in the field of plant litter decomposition. It turned out, however, that the main part of more recent work was directed towards boreal and temperate forest systems and therefore, with a focus on these ecosystems we finally concluded a synthesis that has a similarity to a case study. Still, we hope that a deeper insight into the behavior of a limited number of litter species will be of value for a generalization and also for the identification of process systems that deviate from those presented here.

We have written the book focusing on the transfer from newly shed litter to recalcitrant humus, describing and explaining the system of chemical changes taking place in the process both on a mechanistic basis and on a more general and regional level, considering different climates and species.

As a synthesis, this book gives some new aspects on decomposition that to some of us may be controversial. Thus, the fact that we emphasize the dominant role of microorganisms in the process may be disturbing to many readers, as well as the strong emphasis we give to the fact that humus layers actually do grow over millennia and that at a considerable rate, and thus really sequester e.g. C and N.

This book is based primarily on data and conclusions made from field studies. We have focused on undisturbed forest systems in an attempt to create a basic understanding and basic mechanisms for the decomposition and transformation processes. Its emphasis is on boreal systems for the obvious reason that there appeared to exist more data about these systems that could be synthesized. The information from temperate systems has rather supported and extended the conclusions, suggesting that the synthesis so far may be applicable to at least both types of systems.

In the topic of litter decomposition and transformations, we can not yet identify different schools of thought; it appears that this field of research has not yet developed far enough. We would rather consider different directions of the research work. Thus, some scientists have attempted to understand mechanisms for the degradation whereas several groups have searched for indices for prediction of long-term decomposition rates.

The synthesis that we present has clearly taken impression of the work by a smaller group of scientists and research groups that we want to mention. Thus, the papers emerging from the group around Dr Marie-Madeleine Couteaux, CNRS, Montpellier has been important to us, like those from Prof John Aber, University of New Hampshire, and Dr Jerry Melillo, The Ecosystems Center, MBL, Woods Hole. Many other persons have been helpful in the process of collecting and developing the information that makes up the backbone for this book. We want to thank all of them and hope they understand that all cannot be listed here.

For the second edition we have used much of the data and the views on regionalization to different climates that have been developed by Prof Vernon Meentemeyer, University of Georgia, Athens, has been extremely valuable. We have been allowed to use unpublished data and express our thanks to Drs Cecilia Akselsson, Maj-Britt Johansson, Anna Hagen-Thorn, Per Gundersen and Åke Nilsson.

Now when the second edition has been finished we want to express our appreciation of the valuable help and support we have received. Thus, we want to thank Prof. Carl-Johan Westman, Department of Forest Ecology, University of Helsinki and Prof Amalia Virzo De Santo, Dipartimento Biologia Strutturale e Funzionale, University of Naples Federico II, for their extensive support for this book. The support of the Brumbaugh Center for Environmental Science, Mount Union College, Alliance, Ohio is also gratefully acknowledged. Substantial financial support for the first edition came from the Commission of the European Union, through the CINTER project (QLK5-2001-00596) and is acknowledged.

Finally, before handing over the book to the reader we would like once again to thank each other for an excellent cooperation.

Helsinki and Napoli, June 2007  
Alliance

Björn Berg  
Charles McClaugherty

Plant Litter

Decomposition, Humus Formation, Carbon  
Sequestration

Berg, B.; McClaugherty, C.

2014, XVII, 315 p. 92 illus., Hardcover

ISBN: 978-3-642-38820-0