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Ulrich Schiewer
Editor

Ecology of Baltic Coastal Waters

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Cover illustration: Aerial photograph of the archipelago inside the North-Ruegenian Boddens. (Photo Hendrik Schubert)

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Prof. em. Dr. sc. nat. Ulrich Schiewer, initiator and editor of this volume, died on the 23 May 2007 at the age of 70 years.

After growing up during the struggles of the Second World War in Pomerania and as a refugee in post-war times in Mecklenburg, Ulrich Schiewer studied Biology at the University of Rostock. He became a plant physiologist and began his career by investigating plant hormones in the group of Prof. E. Libbert. He was very active in this field, successfully investigating the mechanisms of salt acclimation of Cyanobacteria, before accepting in 1988 a call from the University of Rostock to take the Chair of Ecology, succeeding Prof. W. Schnese. Since that time, he instigated, designed and conducted a series of complex mesocosm experiments aimed at elucidating matter fluxes and the food web structure of eutrophied brackish systems.

As head of Biology, he guided the Institute through all the ups and downs of German unification, and was always able to find acceptable solutions for all the various problems that arose at this time. It is to his credit that the Institute of Biology was able not just to survive this period, but to become a widely acknowledged centre of coastal ecosystem research. Many national as well as international collaborations initiated by Prof. Schiewer, involving not only the Baltic Sea states, but also, among others, the United States, The Netherlands, France and India, still remain active today.

Prof. Schiewer mentored many dissertations and theses, and several of his former students are now working successfully in the field in which he guided their first steps.

In recognition of his achievements, Prof. Schiewer was appointed an honorary member of the Baltic Marine Biologists, an organisation in which he was active for almost three decades. He remained active in the field also after his retirement, publishing and actively attending conferences. Prof. Schiewer sat on the editorial board of several international journals and was an internationally recognised and respected scientist who published almost 200 original articles, books and other contributions.

At Rostock University, Ulrich Schiewer will be remembered not only as a highly respected scientist, but also for his boundless curiosity, kindness and generosity.

In addition to his wife, Prof. Schiewer is survived by his son and two grandchildren.

This book, which he completed shortly before his death, is not only a comprehensive overview of existing knowledge and a signpost for future development, but also serves to illustrate the enormous increase in our knowledge of brackish ecosystems gathered from all areas of the Baltic during Prof. Ulrich Schiewer's fruitful scientific career.

University of Rostock Prof. Hendrik Schubert

Preface

The Baltic Sea is one of the most investigated water bodies in the world. For decades, the many highly industrialised nations around the Baltic have financed basic and applied investigations, as well as the building and development of research stations and vessels.

After World War II, research in the Baltic Proper was intensified and investigations became much more international. The main goals of such investigations were analysis of the eutrophication and pollution of the Baltic Sea, and development of mitigating strategies (e.g. the HELCOM-Program). In contrast, research into the coastal zones was carried out mainly under national sovereignty by individual governments due to differing political regimes. Consequently, there was a lack of international collaboration and publications regarding these regions. This changed following the collapse of the former socialist governments. Nevertheless, research activities in the coastal regions still lag behind those in the Baltic Proper. A general description is further hampered by the great variety of coastal water ecosystems.

The aim of this book is to overcome this lack by presenting the important Baltic coastal zones in the form of "ecological case studies". In this way the book represents an important supplement to literature concerning the Baltic Proper.

The book begins with an overview of the Baltic Sea as reference ecosystem ("Introduction"). This is followed by a short presentation of the main characteristics of the "Baltic Coastal Zones". The ecological case studies that follow concentrate on the main types of coastal waters. They are subdivided into four groups.

"The Southern Baltic Coast" is represented by Fjörden, Boddens, Lagoons and nearshore zones. These differ in origin, in freshwater influence as well as in water exchange with the Baltic Sea. Dominance of sandy/muddy beaches is characteristic of most coastal waters in Mecklenburg-Vorpommern.

"The Eastern Baltic Coast" is characterised by great gulfs (Gulf of Gdansk, Gulf of Riga), which are in turn characterised by strong freshwater influences and coastal deltas (e.g. Gulf of Gdansk). Connected to the Baltic Proper, they are also influenced by organisms living in stable salinity.

"The Northeastern Baltic Coast" is concentrated on the Neva Estuary and the Gulf of Finland. While the Neva Estuary is dominated by the Neva River, additional small islands are characteristic of the Gulf of Finland. In contrast to the

southern and eastern coast, including the Neva Estuary, hard bottom and rocky coasts are also typical here.

"The Western Baltic Coast" is, in its northern part, influenced by the decreasing water level of the Baltic Sea. The west coast is represented by typical fjords and hard bottoms in Sweden, while in Denmark coastal bights are common too. The Stockholm Archipelago and the Askö area are mostly well connected to the Baltic Proper. Odense Fjord and Kerteminde Fjord/Kertinge Nor are confronted with tidal activities and higher salinities.

Ecology of Baltic Coastal Waters represents the first science-based concept for a comparative description of the high ecological diversity of Baltic coastal waters, and demonstrates the broadly different reactions of these ecosystems and biocoenosis to natural and anthropogenic influences. The background to these activities depends not only on time and the seasonal dependencies of abiotic factors, but also the production, transport, sedimentation, transformation and degradation of organic material and nutrients. These are the ecological factors underlying the broad range of filter and buffer activities of the coastal waters. This book represents the first attempt to present data on Baltic coastal ecosystems in a clear and comprehensive way to a broad scientific audience.

Where possible, the structure of each contribution follows a common scheme: environmental characteristics; planktonic communities (structure, dynamics and productivity; nutrient cycles); benthic communities (structure and productivity; nutrient cycles); benthic–pelagic coupling and eutrophication (morphological, hydrological background; physico-chemical processes; biological processes and interactions; protection measurements); summary or conclusions.

The final chapter, "Synthesis", compiles the main data, considering common and differing characteristics and processes as well as research deficits. The chapter aims to compile general evidence for the coastal waters and outline the main differences from the Baltic Proper, leading to evaluation of both research deficits and common protection measurements.

A short summary of the main results, conclusions and the outlook for further development in coastal research round off the book.

Rostock, April 2007 Ulrich Schiewer

Contents

Part II.C Northeastern Baltic Coast

Part II.D Western Baltic Coast

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