

Preface

Physiological plant ecology is the science of plant life under the influence of abiotic and biotic factors. The aim of this science is to elucidate the underlying mechanisms of these processes and to understand their roles in the life and performance of diverse plant groups and species in their habitats, since it is the knowledge of their structural and functional diversity which ultimately explains the broad spectrum of plant life.

The many aspects of comparative ecophysiology are covered in separate sections of the book. Chapter 1 addresses the abiotic environment of plants and provides a survey of the interactions between organisms including chemical communication. Chapters 2, 3, and 4 cover carbon metabolism and the production of dry matter; the mineral nutrition of plants and the responses of plants to different soil types; and plant-water relations, respectively. Chapter 5 deals with the processes of plant development under the influence of environmental factors. Lastly, Chapter 6 emphasizes the stress physiology of plants. It is devoted to the increasing importance of the roles of climatic, edaphic, and anthropogenic disturbances in the life of plants.

In the text, only those authors are cited who provided fundamental definitions and equations. In the captions of the tables and figures, however, numerous references are cited to stimulate additional reading. Although physiological plant ecology has become an exciting interdisciplinary science, it is by no means a recent field of research. I have tried to portray its rich historical background in the choice of illustrations and tabular material. The results presented reflect the breadth of vision, the struggles and successes of the pioneering experimental ecophysiologists, as well as the most recent advances in knowledge.

The new edition has been completely revised and updated with current state-of-the-art knowledge. New in the current edition are contributions by experienced experts who provide insight in the recent developments in their fields of research as well as recent advances in research addressing specific and regional problems. I would like to express by warmest thanks to all the invited authors for their contributions highlighted in the boxes; the new edition gained substantially by these contributions.

I am greatly indebted to the many readers, whose helpful comments and recommendations significantly improved all editions of the book. During the last few decades, researchers from all over the world have been corresponding with me and have been sending me publications, including those

of regional scientific journals. Thus, it was also possible to incorporate not easily accessible data and results like pieces of a puzzle into a comprehensive scientific image. I am greatly indebted to all these scientists engaged in basic and applied plant biology.

It is a great pleasure to express my utmost appreciation to Prof. Elisabeth Huber-Sannwald, Ph.D., of the Instituto Potosino de Investigación Científica y Tecnológica in San Luis Potosí, México; she translated competently and carefully all additions and changes in the 4th edition from German into English and revised the whole text with up-to-date terminology and style. The translation conveys in every way my original intention.

The figures and the layout were designed by "pdl, Dr. Eugen Preuss" in Innsbruck, Austria. I wish to express my sincere thanks to the whole team for their patience and creative support.

Lastly, I am particularly grateful to Dr. D. Czeschlik and the team at Springer-Verlag for their highly efficient and friendly cooperation for many years; especially to Ms. Ursula Gramm, Desk Editor in Life Sciences, who assisted in the production of this book with exceptional involvement.

Walter Larcher