

PREFACE

This book is essentially a modernized and updated revision of Meyer, Anderson, and Böhning's *Introduction to Plant Physiology*, first published in 1960, which was in turn a condensed version of the older well-known *Plant Physiology* by Meyer and Anderson, last revised in 1952. Although the topical sequence and general philosophical approach of the first edition of this book have been retained in the main, the text has been largely rewritten in order to bring it abreast of recent advances in this field of knowledge. The order of presentation of the major topics appears to the authors to be both logical and psychological, but they can be used in other sequences if so preferred. A studied attempt has been made to integrate discussions from chapter to chapter in order to assist in the realization that a plant operates as a coordinated unit.

This text is designed primarily for use in a one-semester or a one- or two-quarter first course in plant physiology. Background training only in general botany or biology and general chemistry is assumed for the students. Although a background in organic or biochemistry would obviously be advantageous even to students in a beginning plant physiology course, it has not been assumed in writing this text, and basic principles of these disciplines are incorporated into the discussion as needed. With appropriately selected supplementary readings the book could be used as core reading material for an advanced course. The many monographs, advanced textbooks, reviews, and encyclopedic articles now available in the field make this kind of a reading program an especially feasible procedure.

The central presentation is concerned with the whole plant, with ecological undertones. The authors feel strongly that this is a proper first approach to an

understanding of the physiology of plants. Cellular and biochemical levels of interpretation are not neglected, however, especially insofar as they contribute to an understanding of the operation of a plant as a coordinated unit. And we have attempted to inculcate some feeling for the wide diversity of physiological reactions—rooted in genetic differences—which exist from one kind of plant to another.

The authorship of an introductory book which does not run to too many pages is in many ways a more difficult task than the preparation of a more extended treatment of the same general subject. The knowledge explosion which has invaded all fields of science in recent years has not made the writing and organization of a compact textbook any easier. The burden of evaluation becomes formidable, as to which topics to cover, the proportionate coverage of the various topics, and the depth of interpretation which is appropriate for each of the topics.

As is true in most introductory textbooks, many interpretations must be more or less simplified or curtailed. The most important considerations regarding any simplified or curtailed treatment of any field of science is that it not only be internally consistent, but also that it be consistent with the more sophisticated interpretations that some students will encounter later as they move into more advanced studies in the field.

Since, in a short textbook, space limitations preclude the development of the subject in depth either historically or intellectually, such a book is unavoidably invested with an aura of authoritarianism which does not represent the true spirit of science. An important role of the teacher is to recognize this built-in shortcoming of a brief text and to attempt to dispel the concept of authoritarian science in the minds of his students.

We have written this book for students and hope that it will be judged by fellow plant physiologists in the light of this objective. Preliminary drafts of most of the chapters have been used as assigned readings in plant physiology classes for one or more years. Such use has resulted in a considerable constructive feedback from students, which has proved helpful and for which we are appreciative. We are indebted to Dr. Paul J. Kramer, of Duke University, for the opportunity of examining certain chapters of his book, *Plant and Soil Water Relationships: A Modern Synthesis*, while still in manuscript form; also to Dr. Carroll A. Swanson, of The Ohio State University, Dr. Francis H. Witham, of The Pennsylvania State University, and Dr. Carlos O. Miller, of Indiana University, for their critical reading of certain chapters. Figures taken from or adapted from other sources are properly credited in the legends.

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