**Fundamentals of
Botany Series**

Vascular Plants: Second Edition
Form and Function

Fundamentals of Botany Series

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Macmillan Education

***Published by
THE MACMILLAN PRESS LTD
London and Basingstoke
Associated companies in
New York Dublin
Melbourne Johannesburg
and Madras***

SBN 333 05468 7

ISBN 978-0-333-05468-0 ISBN 978-1-349-00364-8 (eBook)
DOI 10.1007/978-1-349-00364-8

© 1964, 1970 by Wadsworth Publishing
Company, Inc., Belmont, California

Reprint of the original edition 1970

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First published in the United States 1964
First published in the United
Kingdom 1965

First edition 1964
Second edition 1970
Reprinted 1973

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Preface

The basic approach of this book—to discuss vascular plant physiology in conjunction with its related structure—remains the same. However, all chapters have been revised in the light of the considerable knowledge we have acquired about vascular plants in the last seven years. The many advances in the study of plant hormones and growth regulators are discussed in Chapters 6 and 8. In Chapter 10, the discussion of transpiration follows an ecological approach and is based on the principles of heat transfer. Although it is not traditional, our students have found this approach dynamic and intriguing. We have updated our discussion of photobiology and the biological clock, and modern water potential terminology is utilized in the treatment of osmosis and related diffusional movements of water.

Besides containing new information and employing new techniques, the second edition has been expanded in other ways as well. The introductory discussion of vascular plants in Chapter 1 is much more thorough. Among the emphasized topics are important adaptations to the land habitat, the features which characterize the vascular plants as a group, fossil histories of the various taxonomic categories, and the reproductive characteristics of plants in these categories. The treatment of the lower vascular plants and the conifers has been enlarged in all chapters. Furthermore, the chapter on the flower has been made more general and is now titled “Sexual Reproduction.” It now discusses reproductive structures in all vascular plants and not just angiosperms. In addition, the treatment of cell structure and function has been greatly

expanded. These additions have made the book capable of standing on its own, though of course it is still very useful as one of the four core books in the Fundamentals of Botany Series.

Series Foreword

Because of the immensity and complexity of the field of botany, the great diversity of plants, and the many methods of plant study, the problem of how to present to the student the highlights of botanical knowledge gained over centuries is not easy to solve. The authors and editors of the volumes in this series believe that an understanding of plants—their parts, their activities, and their relationship to man—is of fundamental importance in appreciating the significance of life. To stress this concept, the form and function of plants, tissues, and cells are treated together. At all levels of organization, in each volume, information gathered by morphologists, physiologists, cytologists, taxonomists, geneticists, biochemists, and ecologists is combined.

Thus, in the volume on *The Plant Cell* by William A. Jensen, the structure and function of the various cell parts are discussed together—for example, mitochondria and respiration, photosynthesis and chloroplasts. The volume by Stanton A. Cook, *Reproduction, Heredity, and Sexuality*, combines the principles of genetics with the means of reproduction in the various plant groups. *Nonseed Plants: Form and Function*, by William T. Doyle, and this volume, *Vascular Plants: Form and Function*, by Frank B. Salisbury and Robert V. Parke, cover the major plant groups and discuss the plants in terms of morphology, physiology, and biochemistry. The relation of plants, particularly vascular plants, to their environment, to each other, and to man is covered in *Plants, Man, and the Ecosystem* by W. D. Billings. The form and the distribution of plants of the past and their relation to the concepts of evolution are considered by Harlan Banks in *Evolution and Plants of the Past*. Herbert G. Baker, in *Plants and Civil-*

zation, discusses the importance of plants to man's social and economic development and the equally important consideration of man's role in the modification and distribution of plants.

In a series such as this, the editors are faced with the task of dividing a broad field into areas that can be presented in a meaningful way by the authors. There must be logic in the entire scheme, with few gaps and a minimum of overlap. Yet an instructor may not want to use the series of volumes in the sequence and manner preferred by the editors. Consequently, each volume must be usable alone and also in any sequence with the others. To achieve such a high degree of versatility is difficult, but we believe the series exhibits these features.

A concerted effort has been made by the authors and editors to maintain a consistent level of presentation. However, each author has been encouraged to approach his subject in his own way and to write in his own style in order to provide variety and to exploit the uniqueness of the individual author's viewpoint. Finally, while presenting the principles of botany we have tried to communicate the excitement of recent developments as well as the joy that comes with the extension of knowledge in any field.

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