PLANT STRUCTURE, FUNCTION AND ADAPTATION

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Edited by

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Preface

In the last ten to twenty years the trend in all branches of plant science has been away from the descriptive to the experimental. During the same period such has been the explosion in knowledge that teachers at all levels have been faced with either selecting particular parts of their subject and treating them in some detail or trying to cover the whole field, which necessarily results in trivialisation of many aspects. The study of plant structure has been one casualty of this syndrome and while in the past a disproportionate amount of time was devoted to this aspect, the pendulum has swung so far in the opposite direction that the result is a generation of students whose understanding of plant processes is handicapped by an insufficient appreciation of the framework in which they occur. A return to past methods would be impractical but it seems to us that a middle course is possible which this book seeks to follow at a level suitable for first- or second-year undergraduates.

The first four chapters deal with the interdependence of structure and function at the molecular and subcellular level, but in addition some stress is placed on the manner in which individual structures—from the complex molecule upwards—are assembled and how such assembly may be controlled. In the four succeeding chapters major plant functions are dealt with in relation to the structures associated with them. At the same time, adaptation in both form and function is discussed. Chapter 9 concerns the angiosperm flower and associated structures. We include this section, not only for the obvious reason that we could not omit a discussion of the reproductive apparatus and how this is adapted to its particular role, but also because it provides an opportunity for following the evolution of a specific plant organ and showing how this has been adapted to suit different conditions through the ages. This is distinct from adaptation as dealt with in the rest of the book where we are concerned with adaptations to present-day conditions. In the last chapter the relationship between the plant life-cycle and the environment is reviewed, particular attention being paid to the ways in which plants are equipped to cope with environmental changes (in terms of structure or physiological response) and how such changes are perceived. While this involves the introduction of new material it is also an attempt to put much of what has gone before into perspective.

This book does not, however, attempt to deal comprehensively with both structure and function, details of these must be sought in textbooks devoted entirely to one or the other. Inevitably omissions have been made, since to include all aspects would result in a work too expensive to buy for those at whom it is aimed. What we hope we have achieved is an account which brings together aspects of the subject which are usually treated separately, in order that the reader can visualise the plant as an integrated entity.

Each chapter has been written by an expert in the field. We have chosen this method because it has become increasingly difficult for any one botanist to be able to write authoritatively on the range of subjects treated here. Consequently, the authors range from biochemists through physiologists to genecologists and ecologists. This fact, perhaps more than anything else, indicates that such a book is needed.

We have not included extensive reference lists since we feel that at this level the average student will neither have the time to read many original publications nor indeed be able to decide which are likely to be most important. However, at the end of each chapter there are short lists of further reading which include reviews, symposia and a few significant original publications.

A certain basic knowledge has had to be assumed, principally of chemistry and biochemistry, but since these form part of most first-year courses in botany we were reluctant to include too much material which would in any case be dealt with more thoroughly in conventional textbooks on these subjects.

I am grateful to the many people who have contributed in different ways in the preparation of this book, but in particular I would like to thank Professor P. F. Wareing, F.R.S., and Charles Fry of Macmillan Press for their advice and helpful criticism, my wife for much help in preparing the manuscript and Mrs D. Redmond and Mrs J. Crawford for typing.

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