

The Physiology of Flowering Plants

Fourth Edition

This latest edition of *The Physiology of Flowering Plants* has been completely updated to cover the explosion of interest in plant biology. A whole-plant approach has been used to produce an integrated view of plant function, covering both the fundamentals of whole plant physiology and the latest developments in molecular biology. New developments in molecular techniques are explained within practical applications such as genetically modified plants. The book further examines:

- photosynthesis, respiration, plant growth and development;
- nutrition, water relations, photomorphogenesis and stress physiology;
- function, with particular attention to adaptations to different habitats.

Each chapter is fully referenced with suggestions for complementary reading including references to original research papers.

The Physiology of Flowering Plants is valuable to both undergraduate and postgraduate students studying plant biology.

HELGI ÖPIK was Senior Lecturer in the School of Biological Sciences at the University of Wales, Swansea until her retirement. Throughout her career she has taught plant physiology at all undergraduate levels, and since retiring has lectured in plant physiology for adult education. Her research interests have included plant respiration and ultrastructure, always aiming at integration of structure and physiological function.

STEPHEN ROLFE was awarded a European Molecular Biology Fellowship and undertook postdoctoral research on the phytochrome regulation of gene expression at the University of California, Los Angeles. He took up a post at the Department of Animal and Plant Sciences, University of Sheffield in 1991. His research interests include the study of photosynthesis and primary plant metabolism, with a special interest in non-invasive imaging techniques.

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Helgi Öpik

*Formerly Senior Lecturer,
School of Biological Sciences,
University of Wales,
Swansea*

Stephen A. Rolfe

*Senior Lecturer,
Department of Animal and Plant Sciences,
University of Sheffield*

Academic Consultant Editor

Arthur J. Willis

*Emeritus Professor,
University of Sheffield*

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Preface

The history of this book dates back to the late 1960s, when the publishers Edward Arnold launched a series of student textbooks as the Contemporary Biology series, designed to provide up-to-date texts at elementary university and final-year school level. One of the first authors who was asked to contribute, on the topic of flowering plant physiology, was Professor H. E. Street, then Professor of Botany at the University of Wales, Swansea. He asked one of us (H.Ö.) to collaborate, and the first edition was duly published by Edward Arnold in 1970 under the authorship of H. E. Street and Helgi Öpik, and entitled *The Physiology of Flowering Plants: Their Growth and Development*. The emphasis of the text was on the 'whole plant' aspects of physiology. The second edition followed in 1976 and the third in 1984, although Professor Street sadly deceased in 1977.

While the second and third editions were still very much revisions of the original text, the longer time interval since the last edition, and the rapid pace at which biological knowledge has grown in the last few decades, have now necessitated a very thorough rewriting of large sections of the book, and the task has been quite challenging in the face of an accumulation of facts that on occasion has seemed quite overwhelming. It is not possible now to interpret many aspects of plant physiology without reference to molecular biology, even when one is basically interested in functioning at the organismal level. This applies particularly to the developmental aspects of physiology. Some reorganization of the text and shift of emphasis has accordingly been necessitated, though we have tried to retain the overall spirit of the original book.

One thing has remained unchanged during the preparation of this book from the first edition to the fourth: the unfailing encouragement and help from our editor, Professor A. J. Willis. Without him, the present text would not have been written. We are also grateful for the support of Dr Ward Cooper, Commissioning Editor, and Dr Alan Crowden, Editorial Director, of Cambridge University Press. Thanks are due for reading, and advising on, parts of the manuscript, to Professor Richard C. Leegood, Professor David Read and Dr Julie Gray of the University of Sheffield.

H.Ö. would like to acknowledge the generosity of Professor Ray Waters, Head of the School of Biological Sciences at the University of Wales, Swansea, for use of departmental facilities in preparing illustrations. H.Ö. also would like to thank Ken Jones of the School of Biological Sciences, Swansea, for printing figures; my nephew Kevin Miller and my niece, Heather Nagey, for help with word processing; and Professor Kevin Flynn and Dr Charles Hipkin of the University of Wales, Swansea, for helpful discussions.

We are grateful to all the people who have permitted us to reproduce their published data, and have provided material and helpful advice for figures; particular thanks are due to Professor Jane Sprent and Dr Euan James of the University of Dundee for supplying the original micrograph of bacteroids (Fig. 4.7).