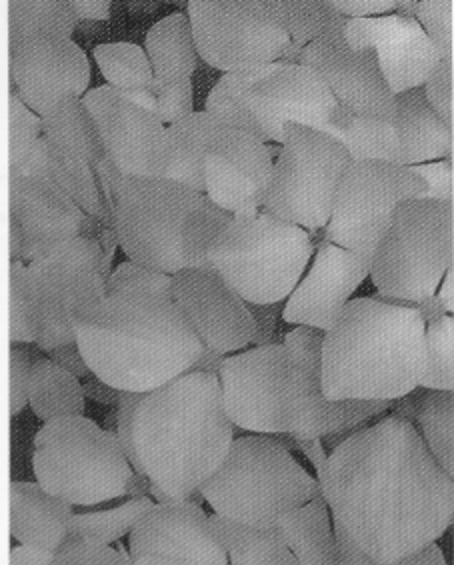


Preface

This book is written for anyone studying plant biochemistry at an advanced undergraduate or graduate level, whether they are taking a course in plant biochemistry or studying metabolism, cell biology, general biochemistry, or more ecological fields including physiology, ecology, and plant–animal interactions. It will also be of value to experienced research scientists who might be entering the field of plant biochemistry for the first time, perhaps with early career training in animal or biomedical sciences. In all cases we expect the reader to have taken some introductory courses in biology and to have a working knowledge of basic biochemistry and cell biology. Consequently, we have chosen to avoid covering topics such as protein and DNA structure, the mechanisms of gene expression and nucleic acid biosynthesis, for example, which are widely covered in introductory level textbooks. Instead, we have taken a research-led approach to each topic in order to bring the reader to a stage where they can then delve more deeply into the scientific literature. With this aim in mind, we have included a list of further reading at the end of each chapter, along with some brief comments that should help to point you towards the most suitable material with which to start your research into the topic.

In writing this book, we have each brought our own perspective on the subject. Between us, we have carried out research (in cell biology, biochemistry, and physiology) and teaching (in biology, biochemistry, cell biology, plant sciences, medicine, and ecology) at universities across Europe, North America, and Asia. This variety of experience and expertise has allowed us to take a wide-ranging approach to each topic with the aim of setting the biochemistry firmly within the context of the whole plant and its surrounding environment. We feel that this scene setting is an important aspect of teaching, so that a biochemical pathway is not simply learned for its own sake but is placed within the framework of what it does, and why it is needed. In many cases we have extended this approach to include a consideration of how our lives might benefit from the exploitation of certain plant biochemical pathways; for example, by the production of pharmaceuticals, food products, and fuels. In many cases these topics are embedded within the main body of the chapter. However, we have also used the boxes as a means of delving more deeply into a topic and of highlighting an area that merits a particular focus in itself. The boxes may be particularly useful as a means of guiding students towards a special topic that could be extended through their own further reading; for example, crop improvement, poisons and feeding deterrents, and novel plant products.

As discussed in Chapter 1, the biochemistry of plants is sufficiently unique that it merits its own textbook. Nevertheless, while some pathways are unique to plants, others, for example the respiratory pathways, are of fundamental importance to most organisms. Consequently, we have taken a comparative approach, using information from animal, bacterial, fungal, and plant studies, where we feel it is relevant to do so. This approach is particularly useful when we have explored the evolution of plant biochemical pathways, with many plastid-located processes; for example,



having originated in the prokaryotic ancestor to the plastid. Hence, while we hope that this textbook will serve to stimulate and to reinforce an interest in plants and their biochemical processes, we also urge students to read widely and to learn from studies of other organisms.

While the three of us have each spent many hours working alone in our offices and studies to produce each chapter, we have also benefited enormously from the support of our colleagues and families. We are particularly grateful to Kirsty Lyons and Liz Owen, of Taylor & Francis, for striking the right balance between gentle and firm reminders of impending deadlines and for providing encouragement to keep us on the right track. We must also thank our families for their tolerance and understanding while we spent yet another evening or weekend immersed in the book. We also thank the following reviewers who gave us careful and constructive feedback on one or more of the chapters: Owen Atkin (Australian National University), Professor Tony Bacic (University of Melbourne), John Barnett (University of Reading), Donald Briskin (University of Illinois at Urbana – Champaign), Lailiang Cheng (Cornell University), Dean DellaPenna (Michigan State University), Jim Dunwell (University of Reading), Robert Edwards (University of Durham), Peter Hedden (Rothamsted Research), Norman Huner (University of Western Ontario), Brian Larkins (University of Arizona), Peter Lea (University of Lancaster), Richard Leegood (University of Sheffield), Enrico Martinoia (Universität Zürich), Denis Murphy (University of Glamorgan), Nicholas Smirnov (University of Exeter), Chung-Jui Tsai (Michigan Technological University), Astrid Wingler (University College London), and Andreas Weber (Heinrich-Heine-Universität, Düsseldorf). Finally, we thank Curtis Givan (University of New Hampshire) for reading and re-reading each chapter and for passing on his own enthusiasm for teaching and learning that has inspired us to try and do the same in return.

Caroline Bowsher

Martin Steer

Alyson Tobin