

Preface

Once again we are privileged to present to the worldwide community of plant biologists a new edition of *Plant Physiology*. The Fifth Edition brackets the 20 years since the publication of the First Edition in 1991, and it embodies the dramatic progress experienced by the plant sciences during these two decades. The field of genomics launched by the publication of the Arabidopsis genome in 1999 has fueled major advances in bioinformatics, genomic analysis, molecular evolution, signal transduction, and systems biology. Exciting progress has also been achieved in the more established areas of plant physiology, such as bioenergetics, photosynthesis, environmental stress, and plant-microbial and plant-viral interactions, helping to propel the plant sciences into the forefront of biological research. As always, our challenge has been to keep pace with the new advances, while continuing to provide students with the vital background information they need for a better understanding of the principles and experimental techniques that characterize the science of plant biology today.

More than ever before, the Fifth Edition is the product of a remarkable collaboration of a truly outstanding team of authors and publishing professionals. All of our contributing authors are not only engaged in groundbreaking research in their respective fields, but can also draw on a thorough understanding of the pedagogical needs of students. Thanks to their efforts we have been able to incorporate into the text the most exciting new developments in the field, written in a lively style, and richly illustrated with drawings and micrographs of the highest scientific and artistic quality. As in previous editions, we have relied upon the advice of an impressive panel of reviewers, as well as numerous suggestions from instructors using the text, to ensure that each chapter is not only as authoritative as possible, but also readily accessible to students with varied backgrounds in biology.

Several new features of the Fifth Edition are noteworthy. Two new chapters have been added: Chapter 2, *Genome Organization and Gene Expression*, and Chapter 14, *Signal Transduction*. The chapters on plant hormones have been streamlined by simplifying the treatments of hormone biosynthesis and transferring the figures of the detailed pathways to a new Appendix 3. This Appendix also contains

sections on Concepts in Bioenergetics and Plant Kinematics which were formerly available only on the text's website. Chapter 1, *Plant Cells*, has been extensively revised and updated, with stunning new micrographs and diagrams. Chapter 26, *Responses and Adaptations to Abiotic Stress*, has been completely rewritten and updated to reflect new paradigms in the field. Indeed, every chapter in the text has been updated to varying degrees to improve pedagogy and to reflect the current state-of-the-art of their respective fields. As in previous editions, the website (www.plantphys.net/) provides supplementary material referenced throughout the text—Web Topics and Web Essays. The website is continually upgraded and expanded, and provides links to relevant sites to enhance the student's learning experience.

As in previous editions, responsibility for the oversight of the chapters, and for integrating them into a coherent whole, has been divided between us, with one exception, Chapter 26, which was edited jointly. The division of labor was as follows: E.Z. was in charge of chapters 3–12, 18, and 26, while L.T. had oversight of chapters 1, 2, 13–17, 19–26, and Appendices 1–3.

We wish to express our gratitude to the outstanding team of professionals assembled by our publisher, Sinauer Associates, especially to our two production editors, Laura Green and Kathaleen Emerson. Laura shepherded the book nearly to the end, applying her deep understanding of plant biology, sharp eye for detail, tireless energy, and tactfulness to the task. Kathaleen, who has been with us since the Third Edition, saw the project through to completion with her usual diligence, patience, and exceptional editorial skills that we have come to expect from previous editions. Our long-time developmental editor, James Funston, deserves much of the credit for the pedagogical excellence of the text. James's unbending commitment to ensuring that the chapters are written in clear, well-organized, and accessible prose pitched at the appropriate level, and to an illustration program that is self-explanatory and makes no assumptions of prior knowledge, have been essential components of the overall success of the book. We are also fortunate to avail ourselves of the services of a truly outstanding scientific illustrator, Elizabeth Morales, whose beautiful drawings have graced the

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pages of *Plant Physiology* since the First Edition. Also we thank Carrie Crompton, our copy editor, David McIntyre, our extremely resourceful image specialist, Jason Dirks, our webmaster, Susan McGlew and Marie Scavotto, our marketing specialists, and Joanne Delphia and Chris Small for their expertise and a clean, contemporary design. And we offer our deepest acknowledgment to our publisher,

Andy Sinauer, for his commitment, highest professional standards and for making Sinauer Associates our home. As always we thank Lee Taiz and Yael Zeiger-Fischman for their love and unconditional support.

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