

Preface

The Third Edition of *Plant Physiology* provides an introduction to the structure and organic functioning of plants. Certain parts of the text have been extensively revised, and a great deal of new material introduced, so as to take into account many recent developments in the field of plant physiology. The author's original aims in writing the book remain the same, however, and the arrangement of materials that proved successful in earlier editions has been retained.

The text is organized into seven sections. Each one treats a specific area of plant physiology, and each is so written that it can be read with little need for reference to the others. The instructor can begin with any one of these sections, depending upon the background of the students and the focus of the course. The reading assigned for each class meeting may thus be selected so that the text material and the instructor's lectures complement each other to an unusually high degree.

The organization of the book makes it suitable for use in either a two- or a one-semester course: a full academic year allows time for a thorough reading of all chapters, while an instructor teaching a one-semester course may assign only the basic portions of each chapter or, alternatively, use only those chapters most appropriate to the course.

This new edition introduces more modern terminology and concepts in the section dealing with water relations in the plant. Such terms as *diffusion pressure deficit*, *osmotic pressure*, and *imbibition pressure* have been replaced, respectively, by the terms *water potential*, *osmotic potential*, and *matric potential*. Conversion to this terminology is desirable because workers in the physical sciences and in soil science are more familiar with the term *potential* and understand it more clearly. Chapters 7 and 8, treating carbohydrates and their

metabolism in the plant, now include discussions of branched chain monosaccharides and the glyoxylate cycle. The Weier-Benson model of the chloroplast, showing the location and orientation of the major compounds that make up the thylakoid membranes, has been included in Chapter 10. The section on photosynthesis, Chapters 10 through 12, has been expanded to include discussion of the Gibbs effect and the Hatch-Slack pathway. Many changes and additions have been made in Chapter 16, "Nitrogen Metabolism"—details have been added on the activities of nitrate and nitrite reductases, along with a revised, up-to-date discussion of protein synthesis in plants. Recent findings on the gibberellins, the cytokinins, and abscisic acid have been included in Chapters 17 and 19, which deal with plant growth hormones. Also new to this edition is a detailed treatment of the presence and importance of ethylene as a plant growth hormone. Finally, a great number of new illustrations have been added and old ones redrawn, making the text a more effective tool for classroom use.

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