

The two opening chapters are devoted to the enzymic activities of the seed: A. W. McGregor reviews α -amylase synthesis in cereals while J. Mikola considers the proteinases and their mobilization during germination. Two related chapters then cover seed lectins (A. Pusztai *et al.*) and oilseed allergens (R. L. Ory and A. A. Sekul). The immunochemistry of seed proteins is highly complex, with its own special terminology, and is a daunting subject to master. It is, therefore, particularly welcome to see included here an excellent and simply explained account of recent developments in the antigen-antibody reactions of seed proteins by J. Daussant and A. Skakoum. The immunological cross-reaction between seed antigen and the antibodies produced from its injection into rabbits is the basis of plant serology and it is appropriate that, in a companion chapter, J. G. Vaughan reviews the recent applications of seed protein comparisons in plant taxonomy.

Our knowledge of the structure and organellar location of seed protein has considerably advanced through the use of amino acid sequencers and scanning electron microscopes, respectively. These advances are discussed by J. C. Pernollet and J. Mossé, with reference to both legume and cereal seeds. The two chapters that follow on the molecular biology and genetics of storage protein synthesis are

restricted to cereal grains and do not have the broad sweep and authority of the Pernollet and Mossé contribution. The final two chapters are concerned with the practical application of scientific knowledge to the breeding and economic utilization of seed proteins. An excellent and wide-ranging essay on breeding plants for protein quantity and quality by P. I. Payne is followed by an equally expert account of technological aspects of cereal proteins by B. J. Mifflin and his colleagues at Rothamsted.

This volume, thus, has as much for the general plant scientist as for the protein specialist and it deserves to be widely consulted. In general, it is excellently produced, although I noticed rather a larger number of misprints than usual. One that might lead to confusion is the mention on p. 239 of triethylamine in three places where trimethylamine is meant. There are a large number of excellent illustrations (e.g. many gel separations and terminal amino acid sequences) and it is packed with relevant up-to-date information. This is an important book to have available and, since it is very reasonably priced, it deserves to do well.

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Plant Carbohydrates I and II: edited by F. A. LOEWUS and W. TANNER. Vols. 13A and 13B, in the *Encyclopedia of Plant Physiology New Series*, Springer, Berlin, 1982. 918 and 769 pp. DM 298 and 268.

Although considerable progress has been made in the last two decades in studying carbohydrate metabolism in plants, there have been relatively few extensive reviews covering this area. The publication of these two companion volumes in the *Encyclopedia of Plant Physiology New Series* is, therefore, particularly welcome. It provides an opportunity to assess the extent to which our knowledge has advanced since the subject was originally covered in this series, in a single volume which appeared in 1958. Needless to say, the approach here, although directed mainly towards the physiological processes of growth and development, is particularly comprehensive and there is as much information on natural occurrence and chemistry as on metabolism and function. The subject matter has been divided, somewhat arbitrarily, into intracellular (Vol. 13A) and extracellular carbohydrates (Vol. 13B), the latter being reserved for those carbohydrates occurring in space outside the plasma membrane. The first volume, thus, deals with the low MW and storage carbohydrates of the plant cell, while the second is centred on the cell wall. Plants are considered in their widest sense and there is as much on the sugars and polysaccharides of fungi and algae as there is on those of higher plants.

The first section of Vol. I contains an expectable series of chapters covering, in turn, sugar phosphates and nucleotides, amino sugars, branched chain sugars, sugar alcohols, cyclitols, sucrose and related disaccharides and sucrosyl oligosaccharides. For the sake of completeness, there is even a short chapter on plant glycosides. The

second section opens with a chapter on starch biosynthesis and there are two more on other reserve polysaccharides. A general account of glycoproteins is followed by a chapter devoted specifically to the glycoproteins of membranes. The last section of this volume is devoted to more biological topics, namely sugar transport, nectar secretion, sugar storage, starch storage and, finally, the mobilization of reserve carbohydrates.

Volume II is divided into five sections, with 11 chapters on the cell walls of higher plants, eight on the cell walls of fungi and algae, three on cell wall secretion, two on cell surface phenomena and two on lectin-carbohydrate interactions. The cell walls of higher plants are discussed from every conceivable angle and there are accounts of their chemistry, ultrastructure, biosynthesis, extensibility and enzymology. Other cell wall components are included (e.g. the lignins) and there is even a chapter on the hydrophobic layers attached to the cell walls, the cutins and suberins. In later chapters, consideration is given to the role of polysaccharides in root cap secretions, plant-pathogen interactions, pollination and in nitrogen fixation.

Having dipped into these two volumes extensively, I can vouch for their accuracy, thoroughness, timeliness and general excellence. One can only join with the two indefatigable editors in congratulating their 62 authors whose magnificent efforts have led to this outstanding production. Together, these two volumes will undoubtedly remain the standard work of reference for the 1980's and they should be widely available in all biochemistry and plant science libraries.

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