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BOOK REVIEWS

Proceedings of the Fifth International Symposium on Insect–Plant Relationships: edited by J. H. VISSER and A. K. MINKS. Pudoc, Wageningen, 1982. 464 pp. Dfl. 130.

The meeting, of which these are the proceedings, was held in early March 1982 so that the editors and publishers have to be congratulated on preparing this handsomely produced, typeset volume so quickly, in fact within *ca* 9 months. Most of the proceedings consists of a variety of fully illustrated and referenced articles, which are either research papers or minireviews. They are grouped together under five headings: physiology, behaviour, ecology, evolution and plant resistance. The final 100 pages contain brief summaries (1–2 pages) of the poster presentations.

As L. M. Schoonhoven mentions in the introduction, entomologists have only fairly recently realized the importance of host plant chemistry to insects and indeed the first symposium in this series, organized by Jan der Wilde, was held as recently as 1958. The interest that has developed since then has been considerable and the present volume with nearly 100 contributions is eloquent witness of the growth of this research area. Although the emphasis in the volume is entomological, plant chemistry is involved directly or indirectly in most contributions and it is quite impossible here to mention more than a few of the many phytochemically-oriented papers.

The importance of secondary substances in determining insect feeding preferences is now widely accepted and further examples of such interactions are discussed in a number of articles. Less obvious to most observers are the more subtle effects that secondary substances may have on insect communication systems. H. E. Hummel and S. F. Anderson present a paper indicating that males of the spotted cucumber beetle when feeding on corn plants fail to respond fully to the sex pheromone of the female if cucurbitacins are released in the neighbourhood. Since the bitter-tasting cucurbitacins are feeding stimulants to these beetles, this would seem to be a case of food coming before sex! What is remarkable about this observation is that such relatively involatile triterpenoid constituents should interact with highly volatile pheromonal signals in this way.

The problems of determining chemical factors responsible for oviposition preferences are considerable and their chemistry has yet to be worked out for most insects. Earlier, E. Stadler and his colleagues in Switzerland considered that the female carrot root fly was stimulated to oviposit near carrot plants by two propenylbenzenes, methylisoeugenol and isoasarone, present in leaf washings. More recent work reported here indicates that other active compounds are present in the leaf wax of carrot, including the acetylene falcarindiol and several linear furanocoumarins, such as bergapten. Thus, the response appears to be a multiple one and it is possible that the compounds are variously perceived at different receptor sites within the insect.

The utilization of secondary compounds obtained from host plants as defence agents by insects is now a familiar phenomenon, particularly with regard to cardiac glycosides and alkaloids, and several papers report new work on such sequestration. Less well-known is the fact that a salix-feeding chrysomelid depends on its host plant for the salicylaldehyde that the larvae defensively secrete. M. Rowell-Rahier and J. M. Pasteels show that salicin-containing *Salix* species are expectably preferred host plants over species lacking salicin. Interestingly, however, larvae will develop on the leaves of a non-host species if the leaf hairs are previously removed by shaving; needless to say, such larvae lack salicylaldehyde in their defensive secretions. Thus, although salicin is an essential plant precursor for the larval defense secretion, it is not apparently obligatory for food acceptance by this beetle.

These three examples indicate the range and interest of the many papers published in this excellent symposium volume. Overall, this book provides a well-balanced panoramic view of current research at the plant–insect interface. It can be warmly recommended to all interested in the many fascinating plant–insect interactions that are mediated by plant chemicals.

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Seed Proteins: edited by J. DAUSSANT, J. MOSSÉ and J. G. VAUGHAN. Volume 20 in the Phytochemical Society of Europe Symposia Series, Academic Press, London, 1983. 350 pp. £28.

In choosing the storage proteins of seeds as the subject matter of their symposium held in Versailles, France during September 1981, the Phytochemical Society could hardly have chosen a more immediately important and practical topic. Not only are the seed proteins of considerable scientific interest, because of their highly complex structures, their function as a nitrogen store and their many enzymic and immunological activities, they are also of immense practical significance since they represent the major source of food protein in both human and animal nutrition. In addition, of course, many research programmes have been initiated during the last decade to improve, or modify, the quality and quantity of proteins laid down in legume seeds or cereal grains. Much of this activity is represented in the 12 review chapters which make up this volume and the whole is a successful blend of the pure and applied knowledge that has recently accrued in this field.

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. Miflin 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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