PREFACE

In this volume of *Advances in Botanical Research* we start with an article by Aldington and Fry on the "oligosaccharins", the name given to that group of diverse oligosaccharides which exerts biological activity in plants, at low concentration. Oligosaccharins have been implicated in a wide range of physiological processes and are frequently described as being "hormone-like". Some of these roles are by now fairly well established, most notably in defence response elicitation. Other roles are still speculative and controversial and this review attempts to explore some of these areas of controversy, to identify gaps in our knowledge of them and to provide pointers for future work. It brings together a wide range of topics, including methods for preparation and chemical characterization, the range of physiological effects, modes of action and transport properties.

Intuitively, it seems fairly obvious that plants must possess strong controlling mechanisms to balance the growth of their various organs and a great deal of research does demonstrate that the growth and behaviour of shoots is coupled closely with that of roots, and that the internal controls are strongly influenced by environment. It has often been suggested that these environmental influences operate indirectly, by regulating the hormonal traffic between the two organs rather than through more direct influences following changes in water or mineral supply and the main thrust of Jackson's article is to assess the evidence relating to this hypothesis. It would appear that no unequivocal conclusions can yet be reached because of limitations in the experiments that have sought to determine hormonal fluxes. The author identifies the need for more quantitative studies which take advantage of modern physicochemical and immunological methods and for computer-based modelling techniques which would enable a more comprehensive exploration of the hormone 'economy' of the whole plant.

The general theory of endosymbiosis of photosynthetic prokaryotes as a basis for evolution of green algae and subsequently land plants is supported by a wealth of morphological, biochemical and molecular evidence. The origin of photosynthetic capacity in other groups of algae is less certain and the very diversity of algal chloroplasts has prompted speculation that they may have arisen from separate endosymbiotic events involving many different prokaryotes, or even the entrapment of photosynthetic

eukaryotes. McFadden's article reviews the morphological and molecular evidence relating to the origin of cryptomonad algae, reaching the conclusion that this group arose from an association between an unknown predatory phagotrophic flagellate and a chloroplast-containing eukaryote, probably a red alga, and thus involves no less than four different evolutionary lineages.

The phenomenon of "alternation of generations" and its relevance to the study of phylogeny, taxonomy and functional biology of land plants was discussed extensively by Bell in volume 16 of this series. In the present volume, the article by Ligrone, Duckett and Renzaglia takes this analysis a step further by considering one aspect of this in greater detail. In all land plants there is an *embryonic phase*, of variable duration, during which the sporophyte generation is in direct physical contact with the gametophyte and the interface between these two generations, the so-called *placenta*, thus plays a critical role in integrating the two phases of the life-cycle. In their review, the authors present a detailed and comparative anatomical and ultrastructural analysis of this interface, including the first detailed and systematic study of many groups of land plants.

As usual, I would like to thank the authors for their excellent contributions, for their patience with the editor and their efforts to make his task easier.

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