

## BOOK REVIEW

**Mitochondria in Higher Plants. Structure, Function and Biogenesis:** by R. DOUCE. Academic Press, Orlando, 1985. XV + 327 pp. \$48.

Compared to the constant flow of monographs and congress reports dealing with chloroplasts, books about plant mitochondria are few and far between. Plant physiologists have to a great extent used results obtained with animal mitochondria, although there are obvious differences between mitochondria from animals and plants. The appearance of two recent books is therefore very welcome. Besides the book by Professor Douce in Grenoble reviewed here, vol. 18 of *Encyclopedia of Plant Physiology* (with Douce as one of the editors) was published in 1985 covering mainly the same topic under the title: *Higher Plant Respiration*. The monograph by Douce is the second volume in a series initiated by the American Society of Plant Physiologists. The first volume, *Plant Peroxisomes* by Huang, Trelease and Moore, was published in 1983 and it is to be hoped that the series will be continued.

*Mitochondria in Higher Plants* has five main sections. In the first the general organization of plant mitochondria is discussed. The importance of the methods of isolation and preparation are emphasized as well as the risks of obtaining artifacts. The second section deals with composition and function of mitochondrial membranes. The various possibilities for oxidative metabolism in the membrane are described and the pathways specific to plants are pointed out. There is also a detailed discussion of the transport mechanisms for various substances and of the connections with proton transport, electrode potentials and ATP/ADP metabolism. The third section is devoted to the mitochondrial matrix, especially the tricarboxylic cycle and its relation to glycine oxidation and photorespiration. The next part deals with mitochondrial oxidative activities in relation to *in vivo* metabolism. The

respiratory control in the electron transport chain and in glycolysis are discussed as well as the pentose phosphate pathway and the  $\beta$ -oxidation of fatty acids. The effects of light via photorespiration and directly on the normal respiration are critically reviewed. The last chapter deals with the mitochondrial genome including the biogenesis and the possible origin from bacteria—without giving any definite answer to this interesting question.

As to be expected from one of the leading research workers in the field, the coverage of the literature is very thorough and up to date—there are 1163 references, 42 of which are from 1984 and eight even from 1985! Curiously enough the first volume in this series is not in the reference list although peroxisomes are discussed in several places in the book. The printing is of high standard, but the presentation of some parts tends to be somewhat heavy, especially on the many pages which lack paragraphs. The index could have been more detailed, e.g. terms like antiport, uncoupling and chemiosmotic theory are not included. There is still much uncertainty also about many fundamental points regarding transport and reaction mechanisms and Douce often calls attention to diverging results and opinions. He also warns against uncritical application of results obtained with animal mitochondria and points out that there may be considerable variation between plant groups.

The book is an impressive achievement. The main aspects are well covered and it gives the unified picture of one author. It raises many questions and will certainly provide many new ideas and suggestions to investigators in this field. The book will be an essential and indispensable reference source to students and research workers for the rest of the nineteen eighties.

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