environmental stress. This group has been at the forefront of very elegant measurements of organ growth. I think we will continue to argue about the rights and wrongs of kinematic and chemical methods for measuring cell cycles (*vive la différence*) but it is interesting how their detailed analyses provide evidence of cell division as a driver of organ growth in some cases and as an accompaniment to growth in others. Plants are sessile and extraordinary biochemical machines. Their ability to switch processes on and off almost instantly must surely reconcile us to merge holistic and cellular theories of development and how cell division impacts on growth. I congratulate Dirk Inzé for assembling a book that so expertly illustrates the complex entwinement of cell division with growth and development in plants. I enjoyed reading each chapter. Possibly there ought to be more cross-referencing but the volume will be an essential accompaniment to anyone working on the plant cell cycle. The market for the volume is consistently the same for all specialist books, i.e. university libraries and a copy in the lab. For me the volume is full of excellent information, carefully and thoughtfully presented. To those who buy/read this volume – enjoy! Of course, it's not quite as good as the very recently published *Eukaryote Cell Cycle* (eds Bryant and Francis) but there again, self-praise is no recommendation.

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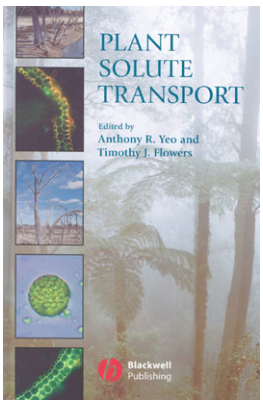

Plant solute transport

Yeo, A. R., Flowers, T. J. eds. 2007.
Oxford: Wiley-Blackwell.
£99·50 (hardback) 424 pp.

From my distant student days I remember finding other similarly titled books very useful. There was *Solute transport in plant cells and tissues* (Baker DA and Hall JL, 1988) and then later came *Solute transport in plants* (Flowers TJ and Yeo AR, 1992), both of which helped me develop my interest in this topic. These books took a broad physiological view. I was therefore intrigued to see how this new book compared with these earlier 'classics'. Before opening the book I had expected the big change to be the arrival of molecular biology and so anticipated chapters brimming with gene families, pictures of *Arabidopsis* knock-out mutants and various 'omics' data.

This book has 15 chapters with 11 different contributors and starts with a general introduction that poses the question, why do plants expend so much energy and resources for the acquisition or synthesis of solutes? A range of reasons are then listed that provide the back-drop for the book chapters that are then previewed in a detailed synopsis for the remainder of this chapter. This ten-page summary provides accurate details of what to expect in each chapter. The second chapter importantly defines 'solutes', where they are and what they do in the cell and how they can be measured. 'Solute' was a rather vague term that the 1992 edition never defined clearly and had unhelpfully stated that, 'it is impossible to list all the solutes in plants' and then went on to list some. The third chapter provides a comprehensive description of the necessary biophysics under the heading 'driving forces for water and solute movement'. The next chapter gives a brief overview of membrane structure and then more detail on the methods to study solute transport. The methodological description is present in the earlier titles too, but it is now brought up to date to include techniques such as fluorescent proteins (e.g. green fluorescent protein and fluorescence resonance energy transfer). Chapter 5 then covers membrane transporters, describing their classification by mechanism. Once again this chapter covers some of the formula background already given in chapter 2 and the colour figures seem unnecessarily small, but this difficult topic is well handled. In chapter 6 the regulation of transporters is described and this is done well with good use of some examples. The next chapter gives an excellent description of transport across organelle membranes and includes a table giving some useful public databases and URLs for gene searches. At 45 pages, excluding references, this is the longest chapter, but it is a big topic where our understanding has recently grown and the text is helped by some clear diagrams. Chapter 8 describes uptake by roots and from most of its content could have been in the earlier titles of this book. Exciting new topics like the genes implicated in root responses to nutrients and root developmental mutants are barely mentioned. The next chapter neatly describes transport from root to shoot, separating water and nutrient flows, and ranging from xylem structure to the physics of water flow through to the carriers and channels involved in xylem loading and unloading. Chapter 10 explains phloem transport and is another strong section that is clearly written. This chapter shows good use of headings that signpost what to expect and let the more casual reader quickly find the relevant section.

Next comes five more chapters by one of the Editors that focus on ecological aspects of the topic of solute transport. These chapters were rather heavy going and wordy with few diagrams or figures to assist in explanations. The first of these is relatively short, describing the factors limiting nutrient supply to roots, and it really seems to belong

within Chapter 8. The next chapters are on nutrient deficiency and toxicity, drought, salinity and finally desiccation tolerance. These five chapters tagged at the end of the book almost appear isolated, as though it was necessary to include some topics overlooked by the contributing authors in order to finish off the book.

The book succeeds in updating the earlier volumes with similar titles and perhaps the nearest recent competitor is *Membrane Transport in Plants* published in 2004 in Wiley-Blackwell's 'Annual Plant Reviews' series and edited by M. R. Blatt. Some authors have contributed to both volumes, but the 2004 book takes a much stronger molecular line, and so does not directly compete but is likely to become out of date more quickly in this fast-moving field. In their preface, the Editors write that this new book is aimed at research workers and graduate students but has wide enough coverage to be used by third-year plant science students. It achieves these aims and so should be in university libraries. Furthermore, as it still covers broad topics in a more physiological way, it may have a wider readership than the more focussed 2004 book. The book's preface gives a clue to the Editors' planning by highlighting plant ecology and the environment that plants must endure to grow and reproduce.

To conclude, this book is a mixture with some excellent chapters and a few lesser ones. There are enough good chapters to recommend the book to students, but I had the feeling that the book was rushed together and that the Editors should have been stricter about the contents of some of the chapters. The book does not give the strong molecular angle that I had anticipated but it is there, enough to fulfil the need to update those earlier, similarly titled books.

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