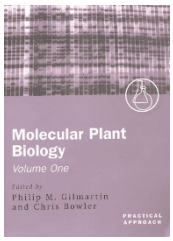
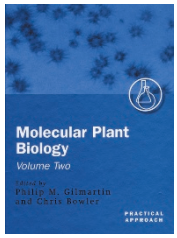
How my garden does grow





Molecular Plant Biology: A Practical Approach – Volumes 1 and 2
edited by Philip M. Gilmartin & Chris Bowler
Oxford University Press · 2002
Paperback, Vol 1 £35/$60 Vol 2 £35/$60

Timothy Nelson

In a preface to *Molecular Plant Biology: A Practical Approach* (volumes 1 and 2), editors Philip Gilmartin and Chris Bowler compare their new collection of contemporary techniques and strategies for plant research with that in the original 1988 edition (edited by Charlie Shaw). The original edition included such state-of-the-art methods as *Agrobacterium tumefaciens*-mediated plant transformation, assays for plastid protein import, gene tagging with transposons from heterologous systems and viewing of gene expression patterns with the *glucuronidase* (*GUS*) reporter gene. The intervening 14 years have seen the evolution and refinement of techniques for plant gene isolation, manipulation and analysis, as well as the arrival of the genomic age, bringing a toolbox that was impossible to imagine at the time of the 1988 edition. All of these contemporary technologies (and more) are well represented, with detailed bench-worthy protocols and discussions.

There is a catch 22, of sorts, for technical compendia in rapidly changing fields. The same rapid rate of technical change that produces a market for an edited collection of protocols also guarantees that it will have a bench life of only a few months or years. Why, then, acquire a printed 'laboratory companion', rather than extract the methods from the primary literature, perhaps from research papers by the very authors represented in this edition? The answer is that each author seeks to illuminate his technical topic far beyond what can be found in most research literature. Each chapter amounts to a workshop presentation, in which an experienced bench scientist introduces a strategy or technique, including history, rationale, applications, caveats and troubleshooting tips. Ideally, the reader is provided with sufficient context and background to optimize their own protocols, using those in the text as a starting point.

Are these two volumes the contemporary molecular plant biologist's "essential laboratory companion", as the jacket blurb proclaims? This will obviously depend on how many of the relevant techniques are already in regular use in your lab or in those of your colleagues. However, I can think of few departments or institutions that might claim to have expertise over the entire spectrum of topics covered in these two volumes.

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So what techniques are covered in these two volumes? The first volume includes sections on gene identification (mutagenesis, transformation, T-DNA- and transposon-tagging, and genomic subtraction), gene organization (mapping, YAC/BAC/cosmid libraries and *in situ* chromosomal hybridization), library screening and cDNA isolation (PCR cloning approaches, western and south-western screens, and complementation cloning in *Escherichia coli* and yeast). The second volume includes sections on gene expression (transcript analysis, *in situ* hybridization, DNA microarray analysis, DNA–protein interactions and inducible gene expression), gene product analysis (expression of recombinant proteins, import of plastid proteins, biochemical fractionation of tissues, yeast two-hybrid screens, antibody techniques and phage-display libraries), and functional analysis *in vivo* (calcium measurements, reporter genes and imaging, and moss gene technology). Certainly, many of these topics have been covered elsewhere in the form of reviews or published protocols, or through protocols at various lab group websites or interest groups. However, these volumes gather the latest iterations of each method, with a common format for style and depth.

The editors made excellent choices for the dozens of expert authors. The authors varied in what they considered to be the right amount of depth, but none failed to provide a solid basic protocol along with a rationale for its application and a list of key references. Although I don't claim to be able to evaluate critically each of the areas in this book, those that I could evaluate are first rate. For example, in volume 2, Sabine Zachgo's chapter on *in situ* hybridization includes a discussion of the pros and cons of various methods, cautions and decisions to consider regarding tissue fixation, options for probe preparation and detection, and optimization of hybridization parameters, among other things. She even includes a tabulated troubleshooting guide to work through difficulties. As another example, in his chapter on classical mutagenesis in higher plants, Maarten Koornneef provides protocols for EMS- and radiation-based mutagenesis of *Arabidopsis thaliana* seeds. However, he also provides a concise rationale for designing mutagenesis in species with different reproductive habits. The chapter is just a few pages long, but you get the essentials, along with a list of key references. Most of the other chapters are similarly thorough and all are very clearly and concisely written.

The answer to the question I posed above is yes, the volumes are a highly useful laboratory companion and essential for those seeking a practical introduction to techniques new to their laboratories. However, the next edition should be scheduled just a few years from now to address the now rapid application of genomic, proteomic and similar large-dataset approaches to many of the same experimental questions treated in these volumes. □

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