In view of the current explosion of interest in plant molecular biology, a book entitled 'plant genetic engineering' is likely to attract a potentially wide readership. The present volume is a collection of articles mainly concerned with reviewing technical advances and evaluating the impact that recombinant DNA techniques may have in plant improvement programmes. It is not a manual of laboratory methods such as appear in the IRL Press 'Practical Approach' series.

The first two chapters, which are rather brief and unspecific, consider the isolation, culture and fusion of plant protoplasts. More substantial is the subsequent chapter on the use of isolated organelles and sub-protoplasts in somatic fusion strategies, and this is followed by short but lucid introductions to the background and development of T1-plasmid-based vectors and potential uses of viral vectors. The three final chapters deal with the actual applications of gene technology to plant systems, with specific reference in chapters 7 and 8 to ribulose-bisphosphate carboxylase and seed storage proteins respectively, and in chapter 9 to a more general cross-section of potential applications. The chapter on seed storage proteins is particularly comprehensive, running to 125 pages, and includes the only discussions in the book on the methods of cDNA cloning and sequencing, and gene expression studies. These sections would perhaps have been better placed earlier in the book, as would some of the important general introductory points stressing, for example, the large gaps in our knowledge of basic plant metabolism, which occur in chapters 7 and 9.

Organisation of material apart, this book collects together thoughtful, highly readable and generally well illustrated accounts of topics of much current interest. It is clearly impossible, in such a rapidly expanding field, to remain up to date, and topics such as the targeting of gene products to organelles and the use of anti-sense RNA are not covered. The book can, however, be recommended to advanced students, researchers, and especially teachers in this area by virtue of its clear presentation of the potentials of, and, equally importantly, the constraints relating to, the application of recombinant DNA techniques to crop plants.

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Most cases of plant genetic engineering rely on conventional transgenic approaches or the more recent genome-editing technologies. In conventional transgenic methods, genes that encode desired agronomic traits are inserted into the genome at random locations through plant transformation (Lorence and Verpoorte, 2004). To counteract plant RNAi-based defenses, almost all plant viruses produce viral suppressors of RNAi (Zamore, 2004). Some viruses also hijack the host RNAi. Genetic engineering is not bound by the limitations of traditional plant breeding. Genetic engineering physically removes the DNA from one organism and transfers the gene(s) for one or a few traits into another. Since crossing is not necessary, the 'sexual' barrier between species is overcome. Therefore, traits from any living organism can be transferred into a plant. This method is also more specific in that a single trait can be added to a plant. Genetic engineering became possible only when scientists had discovered exactly what is a gene. Prior to the 1950s, the term gene was used to stand for a unit by which some genetic characteristic was transmitted from one generation to the next. Today, scientists have tested more than two dozen kinds of plants engineered to have special properties such as these. As with other aspects of genetic engineering, however, these advances have been controversial. What is genetic engineering? Well, it’s when a gene of a particular organism is harnessed and the copy inserted into the DNA of another organism to modify its characteristics. An organism is any living thing such as humans, plants, and animals. To understand how genetic engineering works, it would be prudent to know how DNA works. This gene interaction might take place at different levels including plant, cell, gene or ecosystem. Trouble could arise if, for instance, herbicide resistant genes find their way into weeds. Through genetic engineering, scientists are able to move desirable genes from one plant or animal to another or from a plant to an animal or vice versa. (Ref. 1) By desirable, it means it can produce an outcome that is regarded as generally â€œbeneficialâ€ or â€œusefulâ€. The organism that has undergone such genetic modification is referred to as â€œgenetically modified organismâ€ or GMO. In essence, genetic engineering is a technology wherein a specific gene can be selected and implanted into the recipient organism.