

Cost-benefit analysis for pesticides

Pesticides: Boon or Bane (Environmental Studies.) By M. B. Green. Pp. x+111. (Elek: London, May 1976.) £2.95.

THIS short book is intended primarily for use in university courses of environmental studies, and by those who are professionally involved with pesticides—farmers, industrialists and legislators. The author is involved in the development of new crop protection products by Imperial Chemical Industries.

The subject of gains and losses from the use of pesticides is developed round the theme of cost-benefit analysis, which is clearly distinguished from investment appraisal. Some of the difficulties are rather glossed-over. How does one optimise costs and benefits for the community as a whole? Those individuals and groups who bear the

external losses often gain no compensation except the altruistic satisfaction that their loss is somebody else's gain. Nor is a detailed example given, so that the subject lacks a feel of reality. Does, for example, control of red spider mite count as a credit or debit? Doubtless orchards sprayed to control red spider mite show a profit over those not so sprayed, but this mite only became a pest after insecticides were used.

The quantitative evidence presented for the agricultural benefits of pesticides is disappointing. Figures are given for both Great Britain and the USA of increases in crop yield, during recent decades, but this will depend on many things besides pesticides—for example, fertilisers, new plant varieties, and irrigation. Estimates are given, mostly for the USA, which has more severe pest problems than we do in Great Britain, for the financial gain from use of pesticides, albeit with no standard error or other indication of these estimates' reliability. The only example for

Great Britain (chapter 4) quotes work by Wheatley and Coaker to show that, for at least 30% of the Brussels sprouts grown in 1968/69, increased use of pesticides would have increased the financial loss.

Discussion of biological effects is very limited: virtually no discussion of pest resurgence, development of resistance to pesticides, or of the creation of new pests. The chapter on effects on wildlife is distinctly misleading.

Most of us are probably agreed that pesticides have an important role. This book shows how this role is seen by a scientist whose job it is to produce them.

F. Moriarty

Dr F. Moriarty has worked at Monks Wood Experimental Station since 1964. His research has been concerned principally with the biological effects of pollutants, especially organochlorine insecticides, on wildlife.

Developments in differentiation

Eukaryotes at the Subcellular Level: Development and Differentiation. (Methods in Molecular Biology.) Edited by Jerold Last. Pp. x+460. (Dekker: New York and Basel, January 1976.) \$32.50.

MESSENGER RNA (mRNA) metabolism is one of the important control points in the information flow from DNA to protein. In studies of development and differentiation therefore it is often desirable to measure the concentration or turnover of specific mRNAs. Until recently this could not be done because the concentrations were below the threshold of detection using the available methods. Two developments have altered the situation: first, the purification of specific eukaryotic mRNAs; second, the copying of mRNA by reverse transcriptase. As P. J. Williamson puts it in his chapter on nucleic acid hybridisation methods: "Mother Nature, working in collaboration with Temin and Baltimore, provided the key to an assay in an enzyme from RNA tumor viruses that copies RNA into DNA". By following the instructions in this manual, other research workers should likewise be able to make pure mRNA templates and complementary DNA, sensitive to as little as 1 pg of specific RNA or DNA, which is sufficient for many purposes.

This book strikes a good balance between highly specialised information, peculiar to the differentiating systems

at the focus of individual chapters, and more general methods. The latter include the isolation, separation characterisation and transcription of mRNA, and the use of nucleic hybridisation kinetics. The authors place due emphasis on various ways which have been found to avoid common pitfalls, for example, the synthesis of incomplete chains *in vitro*, polypeptides in the case of the popular wheat germ translation system (used to assay messenger activity), or DNA copies of mRNA in the case of reverse transcriptase. Mother Nature does not always collaborate with molecular biologists in her distribution of enzymes. Consequently, readers will appreciate the tips for eliminating or suppressing unwanted nucleases in various preparations. A high degree of specificity is required for many of the bioassays. Nonspecific precipitation can invalidate the results obtained using antibodies to characterise the products of *in vitro* translation, and several authors describe how they keep this to a minimum. A certain overlap between chapters concerning these tricky areas of experimentation is if anything helpful.

The mass of detail on gel electrophoresis of RNA and protein, repeated for a number of systems, is perhaps excessive, especially in view of the abundance of earlier reviews. On the other hand, there is too little space devoted to the manipulative aspects of hybridisation, particularly when the use of small (2 μ l) reaction mixtures in capillaries is recommended. The editor rightly celebrates the use of immunoprecipitation to isolate specific polyosomes for purification of the less

abundant messengers. It was disappointing, however, not to find this method represented anywhere in the text, not even for the isolation of ovalbumin mRNA, which nicely demonstrates its potential. It was refreshing to read about biological systems as diverse as the insect chorion, slime moulds, red blood cells, lung, muscle and oviduct, in successive chapters. One important system is conspicuous by its absence; much progress has been made with immunoglobulin mRNA, and methods used in this work are sufficiently specialised to merit description.

The book is valuable as a timely source of information about new methods in molecular biology which are not collected together elsewhere. Like sucrose gradient centrifugation, the new methods will be of enduring value to future molecular biologists. The material in this book is well organised and thoroughly cross-referenced. My only complaint about this, the eighth in the series, is the grouping of the Figures at the ends of the chapters. To use this manual effectively, the reader must be dextrous in using his fingers to mark the appropriate parts of the text, the Figures, and the references, while turning the pages with his right hand. I am glad to possess this book: there should soon be many well-stained copies on laboratory benches everywhere.

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