

BOOK REVIEWS

Combating Resistance to Xenobiotics: edited by M. G. FORD, D. W. HOLLOWAY, B. P. S. KHAMBAY and R. M. SAWACKI, published by Ellis Horwood, Chichester for the Society of Chemical Industry, 1987, 320 pp. \$125.40.

The introduction of penicillin for controlling human infections in the 1940s ushered in a new era in medicine which is still with us today. However the dream of controlling disease by chemical means through the discovery of new drugs rapidly faded as microbial strains resistant to such antibiotics became apparent within only a decade. Similarly, the agrochemical industry developed new tailor-made insecticides, fungicides and herbicides during the 1960s and 1970s which at first appeared to solve all the farmers' problems. Again, resistance to such treatments developed within only a short period. One answer to natural resistance to these xenobiotics—to replace the old pesticide by the new—has also failed. The management of antibiotic and pesticide resistance in both the hospital and on the farm is a much more complex matter than this and most of this book is given over to discussions of the methods of combating such resistance. International co-operation is patently essential in any strategy for control and it is good to see in one of the opening chapters by C.N.E. Ruscoe of ICI that the agrochemical industry has set up action committees for this purpose. There is also an excellent opening contribution from Dr Graham-Bryce of Shell outlining the agricultural problems that lie ahead for mankind because of this resistance.

The succeeding chapters of the book consider in turn

the present situation that pertains in the case of resistance to such antibiotics, fungicides, insecticides and herbicides as the tetracyclines, ethirimol, synthetic pyrethroids and the triazines. This is often a matter of population genetics and estimates of how best to deal with the new genotypes that arise spontaneously in the pest in question. More interesting to the biochemist are the two final sections of the book which are concerned with mechanisms of resistance and structure-activity relationships. Clearly, there is much more yet to be learnt here. In discussing herbicide resistance mechanisms, D.K. Lawrence of ICI comments that "selective metabolism is the most commonly reported mechanism causing herbicide selectivity. Perhaps the most surprising aspects are the diversity of biotransformations involved, and the lack of any obvious links between taxonomy and the specificity or activity of the enzymes which perform the conversions". The reason why one herbicide works and another does not is still relatively unpredictable as is resistance to that herbicide. The idea of introducing genetically engineered herbicide resistance into crops is highly fashionable today but, as this writer comments, it has yet to prove itself.

This book then provides a useful and pertinent summary of present day problems in pesticide resistance and of the practical measures that can be taken to combat such resistance in agricultural practice. It is a well produced text with much tabulation and good reference lists and it can be thoroughly recommended.

*School of Plant Sciences,
University of Reading*

JEFFREY B. HARBORNE

Solute Transport in Plant Cells and Tissues: edited by D. A. BAKER and J. L. HALL, Longmans, Harlow, 1987, xx + 592 pp. £60.00.

The editors of this monograph remind us in their Introductory Chapter that all forms of life ultimately depend on green plants (and some microorganisms), not only for their organic matter but also for their mineral nutrients. It is the uptake of these mineral nutrients by plants, and the transport of them and of the organic solutes within the plant that form the subject of the 14 chapters collected together here. After an Introductory Chapter from the editors on the fundamentals of solute transport, subsequent chapters deal with transport at the subcellular level—mitochondria and chloroplasts (Prebble), plasma membrane and tonoplast (Poole); the peculiarities of transport in fungi (Sanders) and algae (Raven); transport across the root (Clarkson), through the phloem (Humphreys), and within the whole plant (Pitman); transport in halophytes (Flowers and Yeo), CAM plants (Lütte and Smith), stomata (MacRobbie), salt glands (Thomson,

Faraday and Oross) and nectaries (Findlay). Tucked away among these more conventional topics there is a particularly useful and thought-provoking contribution by Tomos and Wyn Jones, which deals with the transport properties of cells *within* tissues. In this chapter the reader is introduced to the novel concept of a "population of 'independently-minded' vacuoles".

With this volume Baker and Hall have updated and extended their "Ion transport in plant cells and tissues" which was published 12 years ago. Many of the chapters in the new volume cover topics that were covered previously, sometimes by the same authors. However the editors have also introduced new chapters to reflect the change in emphasis that has occurred in the field of plant solute transport during the intervening years. For example increased attention is now given to topics such as CAM and the tonoplast, where significant progress has come from biochemical and physiological studies of isolated membranes.

According to the publisher "The increased intensification of modern agriculture... has created a greater need

to understand the basic processes involved in the uptake and movement of substances within plants. Study of these transport processes is therefore a rapidly expanding area within the plant sciences." This is not a well-chosen argument, when EEC farms surpluses and problems with the environment are obliging us to think in terms of the increased extensification of a post-modern agriculture. As the pendulum swings away from intensification, will there be a lesser need to understand the basic processes of plant

transport, and consequently will study of these transport processes cease to be a rapidly expanding area within the plant sciences? For anyone who nevertheless needs to understand the transport processes that occur in plants this collection of well presented, authoritative contributions will be essential reading for some years to come.

*Plant Science Laboratories,
University of Reading*

PHILIP JOHN

Air Pollution and its Influence on Vegetation: edited by H. G. DÄSSLER and S. BÖRTITZ, Dr. W. Junk Publishers, Dordrecht, 223 pp. £46.50.

To justify the expenditure of almost fifty pounds on another book about air pollution, it must be expected that such a book makes an important contribution to the existing literature. This book clearly falls short of such intentions and it must be suspected that its main aim is to produce revenues by covering a currently highly popular research topic. While the structure of the book and the way some of the old literature is cited, demonstrates how little progress has been made in recent years, this is no excuse for not including the recent literature where new discoveries have been made, especially work with more realistic pollutant concentrations over longer periods of time. The book title suggests that a comprehensive treatment of the wide variety of air pollutants was intended

but coverage of the various air pollutants is inconsistent and appears haphazard throughout the book. Every paragraph contains statements that are not supported by citations from the literature. The only interesting contribution of the book, to me, was the citation of work carried out in Eastern European research institutions. For those that speak German and do not mind struggling through the mostly German references and afterwards having to order them from abroad, the book may include some new aspects of the literature one was not aware of before. But even in this respect, the book is incomplete and largely outdated. Literature written in English is largely not cited. Consequently, if you have fifty pounds to spare, spend it on something else.

*Institute of Environmental
and Biological Sciences,
University of Lancaster*

HORST MEHLHORN

Drought Tolerance in Winter Cereals: edited by J. P. SRIVASTAVA, E. PORCEDDU, E. ACEVEDO and S. VARMA, Proceedings of an International Workshop, Wiley, 1987, pp. xvi + 387. £25.50.

This issue brings together the proceedings of a workshop held in Capri in October 1987 in the framework of the International Center for Agricultural Research in Dry Areas, (ICARDA). A major objective of this organisation is to develop improved winter cereals from the dry areas of West Asia and North Africa. The participation in the meeting must raise eyebrows due to the absence of contributions from Greece, Turkey, Israel, Egypt, Tunisia and Algeria, all part of the area under discussion. A very large number of participants from the host country, Italy, took part and the next delegation in size was from Syria and followed by a large number of participants from the U.K., other countries are essentially represented by a sprinkling of participants. This does not make it a representative, International meeting, as claimed in the preface and foreword.

The volume is divided into four sections: I. The Frame Work for Winter Cereal Research; II. Breeding for Winter Cereals in Low-rainfall Areas; III. Physiological Research for Drought Avoidance & Tolerance and IV. Plant Characteristics Required for Improved Performance. The first section chiefly brings data on the climatological ecology and interaction between crop genotypes and their environment and tries to analyse potential vs actual yields in a water limited region.

The second section chiefly discusses possibly breeding strategies and attempts to suggest some physiological and morphological traits which might be used in the breeding and selection programs. This section brings a fair amount of experimental data on the behaviour of certain kinds of cereals under difficult conditions but most of the information is of the review type.

The third section on physiological research deals chiefly with some aspects of water relations under drought condition and with some aspects of stomatal conductance and its significance. Again most of the papers are of the review type and very few new experimental data are presented. The most thoughtful of the articles is probably