

ance of individual varieties and environments while a variable number of multiplicative terms model the variety-by-environment (GE) interaction. AMMI is a straightforward extension of principal component analysis and one of a range of methods which have been found useful for exploring the pattern of GE interaction. Interestingly, Gauch has also shown that AMMI can give better estimates of variety comparisons for individual trials by using indirect information from other trials.

We now come to the author's main thesis. This takes AMMI methodology beyond its original purpose for GE pattern analysis and argues for its use in variety recommendation and selection. Remarkable gains in efficiency are claimed to result. However, GE interactions deduced from current trials data are only useful for predicting future variety performance in specific locations if the interactions are consistent over years. Unfortunately this is often not the case and the grouping of locations into recommendation domains, so called 'megaenvironments', by some breeding programmes does not stand up to close scrutiny. Notably, this book illustrates the megaenvironment concept with only hypothetical examples.

The author consistently ignores variability between environments and extrapolates recklessly from results for individual trials. He proposes that a farmer might base variety choice on results from the closest trial location, rather than average results for the region, which may in practice better reflect the range of environments the farm will experience from year to year. He continually emphasizes the benefits from increasing actual or effective trial replication, ignoring theoretical and applied results which show that the greatest constraint on progress in variety selection is unpredictable GE. Finally, he uses a set of additional replicates from the existing sample of trials as a validation set for assessing predictive ability of AMMI models: a more appropriate choice using parallel results from a further year of trialling indicates that the inclusion of AMMI interaction terms is seldom justified. If recommendations about the local adaptability of varieties are to be made, a much more detailed investigation of GE is required, which should ideally make use of additional covariate information on locations.

So should a plant breeder read this book? (The outrageous price will certainly discourage individual purchase). Despite its faulty logic and rather irritating, revelational style, the book still provides useful insights about modelling and the nature of pattern and noise. Unfortunately, the author has the habit of pointing out pitfalls clearly to others, and then falling into them himself. The analysis of variety yield trials deserves a more modest and thoughtful treatment than this.

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**Ecology and Evolution of Plant Reproduction: New Approaches.** Robert Wyatt (ed.). Chapman and Hall, London. 1992. Pp. 397. Price £45.00, hardback. ISBN 0 412 03021 7.

It is 10 years since the publication of Mary Willson and Nancy Burley's *Mate Choice in Plants*, 5 years since Jon and Lesley Lovett Doust edited *Plant Reproductive Ecology*. These books exuded a youthful enthusiasm, reflecting how the study of plant reproduction was being transformed by the application of sex allocation theory, game theory and, perhaps above all, kin selection theory. Could this impetus developed in the 1980s be maintained in the 1990s? The *New Approaches* subtitle of this volume hints at this. However, it turns out that what is being approached is a respectable middle age.

It is the book of a conference held in 1991. Half of its 14 chapters focus on the biology of the male function. The discussion by Maureen Stanton and co-workers on the difficulties of estimating the success of cosexual plants as paternal parents is particularly enjoyable, as is the account by Andrew Stephenson and co-workers of the physical factors that can influence pollen performance. James and Barbara Thomson provide a thoughtful chapter on pollen presentation in animal-pollinated plants, but their description of pollinator types as good, bad and ugly failed to make my day: mnemonically convenient it may be, but ugly pollinators are surely creatures that, along with flopsy bunnies and big bad wolves, belong in a fictional bestiary, not the real world.

The rest of the book ranges over a number of topics, and it is particularly in this part that the arrival of respectable middle age is most apparent, with several chapters indicating that the enthusiasm with which some assumptions have been held should be tempered. Kent Holsinger, for example, argues that it is not sufficient to shake the stick of inbreeding depression at the problem of the distribution of self-fertilization, whereas Joseph Travis takes issue with measures of fitness, arguing that fecundity may not always provide the best measure. Susan Mazer points out that the assumption that investment in the male function should be favoured under stressful conditions has failed to take into account the possibility that seeds may provide the best means of escape from a resource-poor environment, in which case increased investment in ovules may be an adaptive response to increased stress.

Perhaps the most provoking argument is made by Michael Donoghue and Samuel Scheiner who question whether it is helpful to apply kin selection theory to the problem of the evolution of the seed. They point out that arguments based on intersexual or kin conflict are not necessary to explain what we know about the behaviour of seed tissues. Problems with the application of kin selection theory are also explored by David Lloyd in an excellent chapter on evolutionarily stable strategies of reproduction. Lloyd argues that collective fitness may be more useful than inclusive fitness as a tool for investigating the selection of social acts in plant reproduction and he argues that although parent-offspring conflict during seed development is virtually ubiquitous it may have minimal

effect and that "... a postulate of cooperation between the generations has more heuristic value than one of conflict".

All in all the book is an interesting read and is to be recommended.

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**Structural Studies of Protein–Nucleic Acid Interaction: the sources of sequence specific binding.** Thomas A. Steitz. Cambridge University Press, Cambridge. 1993. Pp. 79. Price £12.95, paperback. ISBN 0 521 41489 X.

If asked for my first impression of this book, I would have to say 'What a psychedelic cover!' Considering its size, this book certainly stands out in a crowd, and apart from its use as an informative aid on the subject of the title, alternative uses come to mind. Despite its outwardly gory appearance, Professor Steitz has, I feel, accomplished something quite rare in a scientific text book. He has presented an extremely well-illustrated, well-informed, yet incredibly compact account of a subject which is surely of interest to anyone either working, or merely interested, in the field of molecular genetics.

The fact that various proteins interact intimately with both DNA and RNA is a long established fact, but have you ever wondered exactly how such proteins contact their targets, or how they may accomplish their various functions? If you ever have, but never really knew, then this is the book for you. At only 79 pages, including references and index, it is anything but hard going. In fact, I read it in an evening. This is a supremely well-illustrated book with over 40 sketch diagrams illustrating predicted protein–nucleic acid interactions, as well as 12 colour plates of molecular models and crystallographic determinations. It is concerned with research which relates molecular genetic analysis to structural predictions in defining the specificities of protein–nucleic acid interactions. Within this remit, the book is a clever compromise between introduction to the novice and short review to those involved in such studies.

The opening chapter discusses general principals and problems behind protein interaction with nucleic acids and serves to arm the reader with the knowledge that will guide him or her through the following pages. In the second chapter, Steitz discusses the various structures common in many DNA interactive proteins and this is important since many such structures will be encountered in subsequent chapters. Initially, I felt that I was being 'short-changed' at this point in the book, and I wished there was a little more discussion of the various DNA-binding structural motifs. Clearly, however, the aim of the chapter was to introduce the general principal of such domains which are discussed in great detail in many aspects of DNA–protein interaction throughout the remainder of the book. The differences between DNA and RNA recognition are briefly discussed before both

sequence-specific and sequence-independent interactions are examined. Repressors and activators, and (I was pleased to find) restriction endonuclease, *EcoRI*, are used as examples to illustrate the interaction of sequence-specific proteins with DNA. Perhaps more perplexing are the interactions based on sequence-independent recognition. The more I read, the more engrossed I became and, although several such phenomena are described in the book, I wished there had been more. With hindsight, however, if there had been more then perhaps I would not have found the book as appealing as I did. Much of its attraction is in its simplicity and compactness. After all, an hors d'oeuvre should only serve to whet the appetite.

Although I felt that an increase in the content of the book might detract a lot from its appeal, I did feel that a short section on the physical/experimental processes used in deriving structural predictions would have been of benefit. This, however, is something which I have always wished to know more about and, as such, may not rate as a valid criticism. However, there are other criticisms which I feel are valid: the spelling could do with a little more attention in places and the cover — well you could always tape it to a rotary lab mixer and 'hey-presto!' you would have an instant interrogative aid from a 60s spy spoof! Considering the nature of the cover and contents of the book together, I would like to be the first to suggest that, if the same cover is to be used for a second edition, an alternative, more appropriate, title might be 'Get Into the Groove'.

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