Pollination renewed

Peter D. Moore

Pollination Biology. Edited by Leslie Real. *Academic: 1984. Pp.338. Hbk $49, £36; pbk $19.50, £15.*

"FIGS, yuccas and specialized orchids have proved to be the exception rather than the rule." Thus Peter Raven introduces this compendium of review papers in pollination biology as he seeks to emphasize that it is a subject in which great changes are taking place. The period of descriptive work, from which the extraordinary stories of host-specific fig wasps and yucca moths emerged, is now past and experimental research on population variation and the selective advantage gained by specific individuals with particular attributes has begun.

As in most areas of ecology, the direction in which pollination biology is heading is towards a search for generalities rather than specifics. Can one, for example, make general statements about the evolution of breeding systems in plants in relation to pollination mechanisms? Can one quantify the degree of competition between plants for pollinators? Or is it possible to assess the adaptive significance of a specific trait, such as flower colour? These are the sort of problems which the book addresses.

The approach is radical, in places almost iconoclastic. Many old and well-engrained dogmas are critically examined and discarded, though they are not always replaced with simple alternatives. Take the evolution of dioecy, for example. It has long been assumed that the separation of sexes on to different plants provided advantages in terms of out-breeding. Here Wyatt claims that this principle is not supported by experimental evidence, but what does account for the development of dioecy is still somewhat obscure. Perhaps it is a matter of resource allocation, sexual selection or predation avoidance.

A chapter by Stephenson and Bertin is devoted to sexual selection in plants and approaches the subject in a logical way by dividing it into two categories: (i) competition between members of one sex for reproductive access to the other sex and (ii) choice of a partner by one of the sexes. Too often these groups have been confused in botanical studies; it is not difficult to understand how males may compete for access to females, but less easy to visualize the element of female choice. The latter is perhaps best regarded as non-random fertilization following pollen deposition, that is, some form of incompatibility. But this is questionably comparable to mate selection in animals. There is also the possibility that the female can favour specific male plants or pollinators by such characteristics as a restriction of flowering time. An interesting outcome of these processes is that sexual selection in plants has not led to the visually obvious secondary sexual characters found in animals, but may often have influenced non-visual, physiological and biochemical developments.

This is a book which tackles many topics of interest to geneticists, ecologists and palynologists. Under what circumstances is wind pollination advantageous? What sensory stimuli determine the foraging behaviour of a pollinating insect? How does the density of a population of flowering plants affect the frequency of visits from a pollinator? These are exciting questions which cut across the boundaries of traditional disciplines.

Viewed as an undergraduate text, which it claims to be in part, the book is not entirely satisfactory. The text is laden with multiple citations; too many subjects are discussed from different angles in separate chapters; and summaries of chapters are often inadequate as a guide to chapter content. But as a source of information and, above all, stimulating ideas for specialists and research workers, this is an extremely valuable addition to a literature which is currently dominated by detail and description rather than a conceptual approach. Figs and yuccas may be the exceptions, but the mundane may yet prove to be even more enthralling. □

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Wholesome genetics

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Eukaryotic Genes: Their Structure, Activity and Regulation.
Edited by N. Maclean, S.P. Gregory and R.A. Flavell
Butterworths: 1983. Pp.474. £52, $99.95.

THE explosion in our understanding of the structure and function of eukaryotic genes is nearly matched by the explosion in books describing it. However, it would seem that Maclean, Gregory and Flavell have produced one of the best accounts yet of the subject.

Far from being a disparate collection of short articles in incompatible styles (as is so often the case), the different reviews contained within the book have been carefully stitched together, in relatively homogeneous and concise format. Another valuable feature is that most of the material is up to date, to 1983, though such praise obviously applies more to some chapters than others. Before each section (group of related reviews), an introduction or summary has been provided. Some of these attempt to be enthusiastic to the extent of light-heartedness; for example: a "collection of DNA segments... has been called either a library (for the intellectuals) or a bank (for the businessman)". I idly wonder which editors refer to gene libraries or gene banks!

My detailed estimation of different sections in the book is as follows. In Section I on gene regulation (which would have been better named "Structural Aspects of DNA in Chromatin"), the first review by Jean Thomas is, to my mind, excellent; it told me all I felt I needed to know about this somewhat biophysical end of the subject. The other two reviews here, dealing with non-histone proteins and DNA modification, are somewhat less useful, though this probably reflects the fact that we know rather little about the involvement of, for example, HMG proteins and DNA methylation in gene regulation. Section II might again have been more appropriately entitled, this time "Organization of 'Unusual' Chromosomes in Eukaryotes" rather than the general title "Organization of Chromosomes". However, the reviews on mitochondrial, lampbrush and polytene chromosomes are very helpful — so many molecular biologists are familiar with various "classic" experiments carried out using these systems but don't really understand their biology.

The third section covers experimental approaches. I found it somewhat disappointing. Why no specific articles on *in vitro* transcription, transient expression and stable transformation of cloned genes? Indeed, the only chapter I felt enthusiastic about here was that discussing the oocyte-egg system. Not that a review of teratocarcinoma and its use in studying gene expression isn't welcome; it is just that more generally-used systems should have had priority.

Section IV on specific gene systems is clearly excellent; while the order of the reviews is again a bit strange, there is here a wealth of information hard to glean in total from other sources. The book ends with a pathetically (and regrettably) short section on plant genes, but its brevity is hardly the fault of the editors. Taking away yeast, which in any case is barely a plant or indeed a eukaryote, very little progress has been made. Perhaps this will encourage more of us to turn to plants. After all, as Goldberg says in his review, plant genes have all the familiar boxes in

TATA, Cap, GT, AG, AATAAA,

so that one could still feel a "mainline molecular biologist".

Both advanced students and more experienced researchers will benefit from reading this book. I suspect it will find a sizeable audience, large enough for the publishers seriously to consider bringing out a cheaper edition. □

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