Book reviews

Drosophila genetics: a practical course. Ulrich Graf, Nancy van Schaik and Friedrich E. Wurgler. Springer-Verlag, Berlin. 1992. Pp. 239. Price £24.50, softback. ISBN 3 540 54327 9.

That which distinguishes a good scientific training from mere erudition is the amount of 'hands on' practical experience in the laboratory. In these days of expanding student numbers, and a diminishing resource base, in U.K. universities at least, a compendium of ideas which 'includes all experiments that can be carried out without expensive equipment' is welcome indeed. This is what the authors set out to provide.

Drosophila melanogaster serves as the classic model for demonstrating the basic phenomena of eukaryote genetics but, apart from its evident versatility in this respect, it can also provide an excellent link organism, catering for those with interests focusing on molecular and developmental phenomena, and those with a more evolutionary bias centred on both whole organism behaviour and the population.

The book covers a good and concise introduction to the biology and culturing of *Drosophila*, with explanation of key symbols and a handy stocklist. This is followed by chapters on morphology, transmission genetics, phenogenetics, mutation, population genetics, cytology and cytogenetics, and molecular genetics. There is a helpful final section giving results and answers to questions, and the work is comprehensively indexed.

The strength of this practical book is in the chapters dealing with formal genetics, mutation, phenogenetics and cytology, which are well and carefully presented with detailed protocols for some interesting work.

The population genetics section is weak, amounting to a paper and not a practical exercise on Hardy-Weinberg equilibrium. This is followed by a suggestion for a short selection experiment while offering only superficial treatment of population modelling. Unfortunately, mating behaviour is treated in a perfunctory way which will do little to foster awareness of the links between behaviour genetics, ecology and ethology. The final chapter on molecular genetics is not experimental and consists entirely of an overview. It is difficult to see this as genuine practical work, although the approach may be useful at an introductory level or where resources are limited. Simple and relatively inexpensive practical work in this area can be carried out using useful protocols in D. B. Roberts' excellent '*Drosophila: A Practical Approach*'.

A useful guide to literature accompanies each exercise and references are given to major works on the biology and bibliography of *Drosophila*. An unfortunate omission, however, is any mention of B. Shorrock's book *Drosophila* with its indispensable and beautifully illustrated short key to common European species, useful for projects involving field work.

What makes the study of mutant genes exciting is what they can tell you about how organisms work. This can be approached using this book by linking practical exercises into a theme. For example, experiments with eye pigments can be used to explore gene interaction and steps in intermediary metabolism leading to synthesis of normal eye colour. An obvious extension, which the authors might have suggested, is to explore the consequences for effective vision in mutants lacking the ommochrome or pteridine pathways by making simple trials for phototaxis in a light gradient, or tests for visual activity using the optomotor response. Such experiments are simple and easy to perform. Brown pigment synthesis in white-eyed *vermillion brown* mutants in which both pigment pathways are blocked can be restored when the larvae are fed a missing intermediate (kynuranine) in the diet. This leads to recovery of normal visual activity which is otherwise severely impaired in phenotypically white-eyed flies. An analogy here can be made with environmental correction of metabolic disorders, as in phenylketonuria. The integration of a theme, from gene to behaviour, can be taken further by looking at the consequences for fitness and making a link with population genetics. Competitive mating tests will show that phenotypically white-eyed males are at a severe disadvantage relative to males in which either the brown or red biosynthetic pathways are intact.

This book is attractive, easy to use, and overall a valuable and worthwhile investment for anyone intending to use *Drosophila* for practical class teaching.

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Evolution and the Recognition Concept of Species (Collected Writings of Hugh E. H. Paterson). Shane F. McEvey (ed.). The Johns Hopkins University Press, Baltimore. 1993. Pp. 234. Price £24.50, hardback. ISBN 0 8018 4409 6.

After more than 40 years of active research on species problems and speciation Ernst Mayr concluded that 'there is probably no concept in biology that has remained so consistently controversial as the species concept' (1982, *The Growth of Biological Thought*, Bellknap Press, Harvard). Paradoxically, Mayr himself certainly came closest to establishing a universally acceptable species concept, at least for biparental organisms, in the biological species of the evolutionary synthesis of the 1940s and 50s.