Book Reviews

Manual of quantitative genetics. Walter A. Becker (ed). Academic Enterprises, Pullman, Washington, USA. 1984. Pp. 190. Price \$9.95.

Although there are renowned text books giving the theoretical basis and methods for the study of the inheritance of quantitative variation these often do not give sufficient detail, particularly for the uninitiated, of the steps involved in calculating all necessary statistics from experimental data. Thus there is a need for “toolkit” publications such as this to fill the gap. This is the 4th edition of this particular manual, the first being published in 1964, and its longevity is testimony to its relevance. Essentially it is a list of recipes showing what particular genetical information can be extracted from a particular experimental design. As such it is aimed at undergraduates or postgraduates coming to grips with quantitative genetics. However it is also useful as a reference manual for investigators in a wide variety of disciplines who wish to extract genetical information from their experiments. One note of caution for plant geneticists. It is very much orientated towards experiments on domestic animals and is a bit weak on analyses used in studying self-pollinating crop species in particular.

Most of the chapters are very short and well written, and topics can easily be found from the index. The first three chapters, which only occupy 11 pages, are introductory, giving the notation used, the underlying assumptions, and the formulae and parameters for the covariances between relatives. The following three chapters, again occupying only nine pages, describe how to calculate selection statistics and give examples of how to calculate predicted gains and correlated responses. Next follows a chapter on calculating statistics from human twin data and then a chapter on repeatability. Then comes the real meat of the book, and to me the most useful, a very large chapter (nearly half the book!) on “Estimation of variation components and heritability”. This presents details of the analysis of the most commonly used mating designs (such as the North Carolina designs) and goes into great depth on how to carry out the ANOVAs, how to calculate the components of variation, what they represent, and how to derive other relevant statistics. A pretty comprehensive chapter. Following this there are chapters on calculating statistics from parent/offspring data and on calculating genetic and environmental correlations between characters. Finally there are chapters on developing selection indices and calculating breeding values from information on relatives.

The book covers most of the types of analysis that are likely to be encountered. One thing it does not do much of, and, I suspect, this is by design rather than chance, is to interpret the statistics obtained to any great

extent. Thus reference to a text book will be necessary to discover the relevance of the values obtained.

Inevitably when reading a book of this kind one can make suggestions about what other analyses should be included. My prejudices suggest that it could contain more on analyses between homozygous inbred lines using single crosses and multiple cross designs. In this respect it is also disappointing to find that there is no attempt to link the different terminologies used in quantitative genetics, namely the Mather and Jinks notation, and the rest! The different notations, although they can very simply be translated, invariably cause confusion to students moving from one reference to the next. A book of this type should be the vehicle for clearing up such confusion.

The manual contains few typographical errors although there seems to have been a lapse in concentration in changing the third edition into the fourth. For example, I counted eight references missing from the bibliography and the index of Tables is wrong. Overall however, the book is very useful for learning the mechanics of estimating genetical components of quantitative variation.

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Induced mutations in plant breeding. W. Gottschalk, G. Wolff. Springer-Verlag Monographs on Theoretical and Applied Genetics 7. 1983. Pp. x + 238. Price DM98.00.

Methods for inducing new genetic variability in crop plants by the application of mutagens have been used by plant breeders for at least 40 years. Yet, according to Professor Werner Gottschalk and Dr Gisela Wolff of the University of Bonn, many geneticists and plant breeders remain sceptical as to its effectiveness. Certainly there has been no lack of research interest, as the 50-page bibliography of this book testifies. Surveys by the International Atomic Energy Agency have indicated increasing numbers of officially released cultivars derived from experimentally induced mutants, whilst their use by researchers for fundamental studies on gene action and regulation has been extensive. The use of induced mutants in plant breeding has been particularly successful in the barley crop. In Sweden seven barley varieties, originating from three X-ray-induced mutants, have been released since 1960. In Czechoslovakia the cultivar Diamant was derived from an X-ray-induced mutant in 1965 and was used in the German Democratic Republic as a parent of the variety Trumpf which has been widely grown in Europe and which, under the name Triumph,