Crosses for virgins

Fly Pushing: The Theory and Practice of *Drosophila* Genetics, Second Edition

By Ralph J Greenspan

Cold Spring Harbor Laboratory Press,
2004 191 pp. concealed wire binding,
\$59

ISBN 0-87969-711-3

Reviewed by Helen White-Cooper

New to *Drosophila* research? Need to combine two mutations into one fly strain and don't know where to start? Want to make a mutation in your favorite gene? Found a T(Y;A) translocation in the stock center with a breakpoint in just the right genomic region for you, but have no idea how to use it? This book is for you.

The first edition of Greenspan's *Fly Pushing* was published in 1997. In theory, our fly labs have at least three copies of this book; the fact that one can never be found on the bookshelf is testament to its usefulness. In desperation, a copy can usually be tracked down on someone's desk, where they have been using it. The new edition is somewhat longer than the old one; new techniques have been added, but nothing has been taken away. The appendix of useful fly resources has improved markedly. Isn't it scary how much more we rely on databases now than we did in 1997? Throughout the book, the changes are less substantial than I would have expected, given the revolutions that have occurred in fly genetics since the pregenome days of the first edition. Along with an annotated genome sequence, we now have the ability to target specific genes by homologous recombination and RNA interference.

The book assumes that a reader has no specific knowledge of fly genetics, and the early chapters are aimed at students and post-docs new to the system. Chapter 1 gets the reader up to speed with how to understand the genetic nomenclature describing fly strains and how to do a cross. I wish I had had this book when I was a fly-pushing novice. The remaining chapters give theoretical background and a series of

practical tips on how to design and execute crossing schemes so that you get what you want at the end.

I have a few quibbles about the organization of some of the new sections. Chapter 2 describes making a mutant, Chapter 3 covers mapping and Chapter 4 deals with manipulating genetic backgrounds. The chapter distinctions are, in fact, less clear than this; if you plan to make a new mutation you need to refer to sections of all three of these chapters. When I want to mutate a particular gene, my first thought is to use transposons. Given the large collections of transposon insertions being made around the world, a section specifically on their use would have been nice. Each transposon has been designed to allow all sorts of clever genetic tricks. The quickest way to generate a mutant is to order it from a stock center. Don't search only FlyBase; also look at the Kyoto collection and the Genexel (Korean) collection. You have to pay for these last stocks, but it may be cheaper in the long run than doing a screen yourself. Given a nearby P-element, the usual choice in my lab is to try 'local hopping' or imprecise excision. I was surprised to see local hopping discussed in only two sentences. Imprecise excision to make small deletion alleles is detailed in the chapter on synthesizing specific genotypes. Deletions created by male recombination, starting with a P-element insertion, are covered in the chapter on mapping. This scattering of related techniques into different chapters makes it harder for the novice to compare approaches and see which is most appropriate for their specific genetic problem.

The second half of the book covers the analysis of new mutations, starting with a section on the classification of alleles and the creation of conditional alleles with inducible promoters. Chapter 6 describes mosaic analysis, starting with the pure genetics approach of chromosome-loss mosaics. This section leads comfortably towards the more commonly used methods for inducing (and using) mosaics: mitotic recombination. The updates to the second half of the book have been incorporated more successfully than those in the first half, making these chapters more useful.

One other niggle: the publishers changed the font, and I prefer the old one, because it was easier to read. Also, in the new edition they made less of an effort to ensure that crossing schemes don't cross page boundaries. Some of the schemes are difficult enough without having to turn the page in the middle!

Would I buy this book? Yes. But the new edition is not as different from the old as I had expected, and so I will not get a new book to replace each copy of the old edition in my lab. New students or post-docs should be encouraged to read the book before designing their crossing schemes, as it will help them on the way to becoming fully qualified fly pushers. ■

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