

BOOK REVIEW

The Neurospora compendium: chromosomal loci

David D. Perkins, Alan Radford and Matthew S. Sachs

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Anyone handling *Neurospora* knows that culture tubes need to be opened with care (like uncorking champagne!) or else clouds of vegetative spores (conidia) become airborne and contaminate the lab. Conidia are capable of such remarkable aerial dissemination because they are kept dry and powdery by a hydrophobic surface formed from self-assembling rodlets of hydrophobin protein encoded by the *easily wettable* (*eas*) gene. A scanning electron micrograph of freeze-etched rodlets of EAS protein covers this book. Here's a quiz: Was this photograph used to (a) aid the book's dissemination, or (b) to waterproof the cover? (Hint: *eas* mutations are present in special strains used for teaching.) The correct answer is given towards the end of this review.

Chapter I (Introduction) is six pages packed with useful information. It describes the *Neurospora crassa* life cycle, and includes a striking picture of the chromosomes in a pachytene nucleus and another that details stages in ascospore development. Personally, I would have also liked seeing a figure, similar to the one in Raju and Perkins (*Genetics* **129**, 25–37, 1991), showing that ever-so-subtle difference in meiotic choreography in *N. tetrasperma*, which distinguishes heterothallism (*N. crassa*) from pseudohomothallism (*N. tetrasperma*). This chapter also gives sources of strains, libraries and clones, and information that is available on the Internet, and also provides information on scientific meetings. It also has a tidbit of special interest to readers of this journal: the first *Neurospora* genetic map, consisting of six loci in linkage group I, was reported by Carl Lindegren in *J. Genet.* **32**, 243–256 (1936).

Chapter II (Information on individual loci) represents the main body of the *Compendium* (191 pages). A brief explanatory foreword, which includes a table of synonymous gene symbols, is followed by 186 pages of entries for genes and other loci (see below for the distinction between genes and loci) arranged in alphabetical order of gene symbols. Since this work is the successor to the earlier compendium (Perkins *et al.* 1982 *Microbiol.*

Rev. **46**, 426–520) it retains much of the earlier format. Each page averages five to ten entries. Entries for each gene include information on its linkage group, data on linkage to other loci, sequence accession numbers if available, and phenotype. Scoring information and technical applications are also provided. The entry for *erg-3*, the one *Neurospora* gene for which I have the expertise to comment on, was quite satisfactory (although publication of the *Compendium* preceded the report of a novel ascospore phenotype that we found for *erg-3*). The null phenotype of many cloned genes is now being ascertained using repeat-induced point mutation (RIP). For this strains duplicated for a fragment of the gene are constructed by transformation of cloned DNA and its insertion as a transgene into ectopic chromosomal locations. Often such transgenes are marked, say with *hph*. I suggest that in future we consider compiling lists of such mapped transgenic loci as well.

This chapter has 63 figures, many describing biochemical pathways that are appropriately simplified for geneticists. Some figures are instructive, e.g. figure 22 describing the use of *sn*; *cr-1* (*snowflake*; *crisp-1*) strains (which can be replica plated) in quantitative studies of recessive lethal mutants. Others add aesthetic value as well; there are scanning electron micrographs (including one of the *eas* mutant conidial surface) and striking pictures of rosettes of maturing asci, a hallmark of *N. B.* Raju (Stanford University). My favourite (figure 37) uses the *per* (*perithecial color*) mutant to show barrage formation as a manifestation of heterokaryon incompatibility.

Appendix 1 gives the rules of *Neurospora* genetic nomenclature. The rules even instruct one on the distinction between 'locus' and 'gene': 'A locus can be defined as a chromosomal site of variable size at or within which is located a gene, a restriction site, a knob, a breakpoint, an insertion, or other distinguishable feature.' Also the difference between linkage groups and chromosomes. My only gripe is that the correspondence between linkage groups and chromosomes was not given in the *Compendium*, instead only the literature references are provided. Appendix 2 presents the genetic maps. The seven linkage groups probably exceed 1000 map units in length. Data

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for RFLP mapping are in Appendix 3, a description of the mitochondrial genome in Appendix 4, and lists of expressed sequence tags from different stages of the life cycle in Appendix 5. The *Compendium* rounds off with 2305 references.

By now it is easy to guess the correct answer to the quiz. It is (b). Perkins *et al.* 2001 doesn't really need

cover photos to aid its dissemination in the *Neurospora* research community. It is recognized to be an essential lab tool by all researchers working with *Neurospora*. In view of the increasing importance of comparative genomics it will also prove to be useful for those working on other systems. So it is obviously appropriate to protect it from accidental spills at the lab bench.