

How to procure *Neurospora* strains for research or teaching.

David D. Perkins

Background

The Fungal Genetics Stock Center

With over 14,000 *Neurospora* strains and with 45 years of service to *Neurospora* workers, FGSC is the source of choice for cultures, for several reasons. The Stock Center, which is supported by the National Science Foundation, is the leading repository and information center for *Neurospora* workers and for the larger community of scientists working with other filamentous fungi. In addition to maintaining the collections and acquiring and distributing strains, FGSC acquires and distributes materials for molecular genetics such as cloning vectors, genomic and cDNA libraries, and plasmids containing cloned genes. It also maintains databases, publishes a stock catalog, and publishes the Fungal Genetics Newsletter (Formerly *Neurospora* Newsletter), which includes refereed research articles, bibliographies, meeting announcements and abstracts, and a directory of fungal workers. For a detailed account of the history and organization of FGSC, its holdings, and its activities, see McClusky (2003).

Scope of the Neurospora stock collection: Since its origin, a central focus of the FGSC has been on genetically defined strains of *N. crassa*, which now total nearly 9,000 singly or multiply mutant strains and strains with chromosome rearrangements. Holdings include strains with mutations at many of the ~1000 chromosomal loci that had already been described and mapped genetically (Perkins *et al.* 2001) before the *Neurospora* genome sequence project revealed that the complement contained a total of >10,000 genes. The collection also contains many strains designed genetically for special-purposes such as detecting linkage, mapping, identifying vegetative (heterokaryon) incompatibility genes, and studying mutation and DNA repair. (Testers and special-purpose stocks are listed in Part VI of the FGSC catalog.) The Stock Center holdings also include wild type reference strains of all the recognized *Neurospora* species as well as over 4,000 field-collected strains obtained by sampling natural populations around the world. Availability of the strains from nature has enabled the construction of phylogenetic evolutionary trees, with implications for speciation and species recognition (e.g., Dettman *et al.* 2003a, b).

FGSC has an enviable reputation for quality and reliability. Throughout its history, the Center has been fortunate in having directors and curators who were highly qualified both in genetics and microbiology. Genetics is strongly represented on the Advisory Board that reviews FGSC activities. Unlike most microbial culture collections, which center on taxonomy and serve as archival repositories for type cultures, the FGSC collection has been shaped largely by considerations of the usefulness of strains for genetic analysis and experimentation. Thus, attempts have been made to obtain genetically defined strains, to document pertinent information about their history, parentage, genetic background, and species status, and to monitor strains genetically.

Preservation of stocks in suspended animation is relatively inexpensive. FGSC has kept the cost of cultures low. The schedule of fees for cultures is structured to favor academic research. Provisions are made for waiving or lowering the charge for beginning researchers, teachers, and others whose ability to pay is limited.

Other potential sources of stocks

Research laboratories: FGSC encourages workers to deposit key strains and strains thought to be potentially useful to others. However, specialized collections of undeposited strains are held by many laboratories. Most workers are glad to share stocks and to give advice on their use. As is reiterated in

policy statements of many journals, researchers are obligated by scientific convention to make cultures available on request, once use of the stocks has been published. This is best assured if they are deposited. See *How to deposit materials in the Fungal Genetics Stock Center*.

Other stock centers: Fungal culture collections throughout the world are described and listed by McCluskey (2004). Neurospora stocks are included in some of these collections, notably the American Type Culture Collection (Rockville, Maryland), Centraalbureau voor Schimmelcultures (Utrecht, Netherlands), and USDA ARS Culture Collection (Peoria, Illinois). The strains in these collections have often been obtained unsystematically and may be of dubious quality and undefined genetic background. They may be of historic or archival interest, however.

Strains fresh from nature: In a tropical or subtropical environment, new strains of Neurospora can be obtained from burned vegetation, soil samples, or contaminated foodstuffs. In temperate areas, Neurospora is encountered in lumber yards, as a contaminant on baked goods, or under the bark of fire-killed trees. See Turner *et al.* (2001), Jacobson *et al.* (2004), Glass *et al.* (1990)..

Procedure

Consult the FGSC *Catalog of Strains*, available on line at www.fgsc.net or as a printed copy from Fungal Genetics Stock Center, Department of Plant Pathology, Kansas State University, Manhattan, KS e-mail: questions@FGSC.net. Orders can be placed on-line (see FGSC home page). See *How to sample natural populations*.

References

- Dettman, J. R., D. J. Jacobson and J. W. Taylor. 2003a. A multilocus geneological approach to phylogenetic species recognition in the model eukaryote Neurospora. *Evolution* 57:2703-2720.
- Dettman, J. R., D. J. Jacobson, E. Turner, A. Pringle, and J. W. Taylor. 2003b. Reproductive isolation and phylogenetic divergence in Neurospora: Comparing methods of species recognition in a model eukaryote. *Evolution* 57:2721-2741.
- Fungal Genetics Newsletter*. Published annually by FGSC. (No. 52 appeared in 2005.) New stocks that have been received since publication of the most recent catalog are listed in odd years. Articles in previous issues (beginning with No. 1, 1962) and accepted articles that await publication in the pending issue are available as PDFs at www.fgsc.net.
- Fungal Genetics Stock Center. 2004. *Catalogue of Strains, 10th Edition*. (The catalogue is published in even-numbered years as a Supplement to *Fungal Genetics Newsletter*.)
- Glass, N. L., R. L. Metzenberg and N. B. Raju, 1990 Homothallic Sordariaceae from nature: The absence of strains containing only the *a* mating type sequences. *Exp. Mycol.* 14: 274-289.
- Jacobson, D. J., A. J. Powell, J. R. Dettman, G. S. Saenz, M. M. Barton, M. D. Hiltz, W. H. Dvorachek, Jr., N. L. Glass, J. W., Taylor, and D. O. Natvig. 2004. Neurospora in temperate forests of western North America. *Mycologia* 96: 66-74.
- McCluskey, K. 2003. The Fungal Genetics Stock Center: From molds to molecules. *Advan. Appl. Microbiol.* 52: 245-262.

McCluskey, K. 2004. Fungal germplasm and databases. In *Applied Mycology and Biotechnology. Vol 3. Fungal Genomics*. G. G. Khachatourians and D. K. Arora (Eds.). pp. 295-322.

Perkins, D. D., A. Radford, and M. S. Sachs. 2001. *The Neurospora Compendium: Chromosomal Loci*. Academic Press, San Diego. 325 pp.

Turner, B. C., D. D. Perkins, and A. Fairfield. 2001. Neurospora from natural populations: A global study. *Fungal Genet. Biol.* 32: 67-92.

DDP.