

Evolution of reproductive systems

The evolution of sex is one of the most controversial questions for an evolutionary biologist. The traditional explanation of the existence of recombination is that it increases the rate of adaptive evolution of a species. However, several disadvantages of sexual reproduction have been proposed, e.g. genome dilution and energy cost, which make the existence of sex one of the most difficult puzzles in biology.

Neurospora is a model system exceptionally suited as a subject for broad studies of the evolution of reproductive systems. In addition of being complex both developmentally and structurally, with genetic mechanisms that are representative of other eukaryotes, it has a simple life cycle and is easy to culture. Currently over 4,600 individuals of *Neurospora* from natural populations are available to the research community. The species of the genus exhibit the range of reproductive behavior seen throughout fungi: obligately outbreeding, selfing, and a mixture of the two, and the evolutionary relationship between them is well established.

Examples of projects (20 p examensarbete) for students are:

- i) What is the evolutionary fate of genes coding for reproductive proteins, e.g. pheromone and pheromone-receptors, in branches in the phylogeny of *Neurospora* delineating selfing species from the outcrossing, and
- ii) Is the energy cost involved in producing reproductive structures a potential driving force in the evolution of alternative reproductive systems?

This project will be accomplished in close connection with colleagues at Harvard University, and may involve research visits between the labs.

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