

## POPULATION GENETICS

SPRING 1999

PROJECT #3

Due: Monday, 10 May 1999

You (or more likely, your graduate students and post-docs) sequenced a series of genes encoding S-RNases from different plant species. The proteins encoded by these genes are intimately involved in self-incompatibility responses in several different flowering plant families—Rosaceae, Scrophulariaceae, and Solanaceae for sure, but possibly others as well. Having collected this data, you're interested in looking at patterns of sequence evolution in the genes. Specifically, you need to answer three questions:

1. What is the phylogenetic relationship among the sequences in your sample?
2. What is the relative frequency of synonymous and non-synonymous nucleotide substitutions along each branch of this phylogeny?
3. What can you conclude about the pattern of natural selection operating on this gene from the patterns of synonymous and non-synonymous substitution that you observe?

Data files containing the sequence information you'll need will be available from the course web site and from the class folder on the EEB network later this oafternoon.