

**Population Genetics**  
**Problem set 4**

1. Assume that the fitnesses are 0.8 for  $A_1A_1$ , 1.0 for  $A_1A_2$ , and 0.4 for  $A_2A_2$ .
  - a) Calculate the mean fitness if the allele frequency of  $A_2$  was 0.3.
  - b) What is the expected equilibrium frequency of  $A_2$  if these fitness values continue?
2. Five alleles ( $A_1$ ,  $A_2$ ,  $A_3$ ,  $A_4$ , and  $A_5$ ) at a single locus (A) have been identified on a plant that prevents self-fertilization by self-incompatibility. If the A locus is at equilibrium, what is the expected allele frequency of  $A_3$ ?
3. Assume that the initial and final allele frequencies before and after selection are 0.2 and 0.1.
  - a) How many generations does it take for this amount of change when there is a recessive lethal?
  - b) How many generations does it take for this amount of change when selection is against a recessive with selection coefficient equal 0.4?