Theoretical Population Genetics

Home work # 5 Fall 2000

1) In the mixed mating model, an individual mates at random with probability t and self mates with probability s. Answer the following questions concerning the mixed mating model.

a) In class, I derived U'. In a similar fashion, show that V' = s (1/2V) + t2pq.

b) Plot the genotype frequencies versus time (generation) for the approach to equilibrium when p = 0.2, p = 0.5, and p = 0.8 if the selfing rate is s = 0.2 and again if it is s = 0.8.

2) In the assortative mating model:

a) show by derivation that $U' = \alpha(U + 1/2Vp) + \beta p^2$

b) plot the change in allele frequency versus allele frequency when $\alpha = 0.2$, $\alpha = 0.5$, $\alpha = 0.95$

c) how many generations does it take before an allele is fixed (i.e., either p or q goes to a frequency of 1.0) with the following conditions? Round your answer to three decimal places.

P	α
0.90	0.1
0.45	0.1
0.10	0.1
0.90	0.5
0.45	0.5
0.10	0.5
0.90	0.9
0.45	0.9
0.10	0.9