Biology 362 - Principles of Genetics
Genetic Drift - Population Genetics – Bottleneck Experiment
(final analysis)

Purpose: We will complete our experiment this week and finally test the hypothesis that genetic drift is greater in small populations than in large populations.

This week we have two immediate goals:

1) Estimate the frequency of mutant flies in our population.

2) Graph the allele frequency data from the preceding four generations and compare the results for both large (n = 24) and small (n = 4) populations.

Estimation of allele frequency.—We will once more estimate the frequency of the recessive allele *a* in our populations by counting the number of wild-type flies (*AA* and *Aa*) and the number of flies exhibiting the recessive trait (*aa*). Random mating among the flies during the last three weeks should result in genotypes frequencies among the offspring to conform to Hardy-Weinberg expectations. Hence, the frequency of recessive phenotypes among offspring should be q^2, where q is the frequency of the recessive allele.

1) Anesthetize your flies with cold.

2) Practice scoring phenotypes - wild-type and recessive phenotypes.

3) Count the number of each phenotype.

4) Calculate q = number of *aa* ÷ total number of flies

Final analysis.—There is now no need to prepare a next generation of flies. You are now at the final stage of the experiment. Hopefully you have been taking good notes and meticulously recorded the results from the preceeding weeks in your lab notebook.

1) Collect the data from each of the four generations. What is the allele frequency for each population large or small?

2) How have the allele frequencies changed following three successive bottleneck experiments?

3) How do your findings compare to other teams in you lab? Are there consistent results? Work with the other teams in your lab to graph all of the data. Your TA will help you analyze the data.