

## **Bio 307 – Principles of Ecology**

### **Population Genetics**

#### **I Introduction and Definitions**

- A. Types of variation**
- B. Basic definitions**
  - 1. Gene, allele, locus**
  - 2. Homozygous, Heterozygous**
  - 3. Genotype, Phenotype**
  - 4. Diploid**
- C. Sources of Variation**
  - 1. Mutation**
  - 2. Recombination**

#### **II Hardy-Weinberg Equilibrium**

- A. Predicting genotypic frequencies from allelic frequencies**
- B. Violations of Hardy-Weinberg Assumptions**
  - 1. Gene flow**
  - 2. Natural Selection**
  - 3. Non-random mating**
  - 4. Small population – genetic drift**
- C. Hierarchical F statistics**

#### **III Genetic Drift and Diversity**

- A. Impact of genetic drift on small populations**
  - 1. Lower diversity**
  - 2. Inbreeding depression**
  - 3. Lower fitness of the population**
- B. Small populations can be the result of**
  - 1. Bottlenecks**
  - 2. Founder effects**
  - 3. Attributes that lower effective population size  $N_e$**
- C. Genetic rescues**

#### **IV Molecular Markers**

- A. Neutral vs Selected**
- B. Some common markers**
  - 1. Allozymes**
  - 2. Microsatellites**
  - 3. SNPs**