Population Genetics and Population History

I. Historical Demographic Events

A. Bottlenecks

1. reduction in population size
2. reduction in genetic diversity
3. high probability of genetic drift
4. examples
   a. plants of conservation concern
   b. possible mechanism for speciation

B. Organellar vs. Nuclear Markers

a. cpDNA is very sensitive to subdivision
   1. uniparental inheritance ->
      lower effective pop. size
   2. reduced migration (generally)
   3. low mutation rate reduces within pop. diversity

II. Phylogeography [phylogeny of populations]

A. genealogical approaches

1. haplotypes
   e.g. cpDNA, mtDNA sequences
2. genealogy of alleles
   e.g. microsatellites

B. phenetic approaches

1. gene frequency statistics
2. genetic similarity & differentiation

C. plant examples:

1. coincident geographic patterns of cpDNA subdivision in the Pacific NW

2. post-glacial colonization history in Europe and Eastern USA

III. Patterns of Genetic Variation in Plant Populations and Species

A. summarized by Hamrick and collaborators in several papers

B. but not controlled for phylogenetic non-independence

C. comparisons can be improved by restricting to congeners, e.g. Gitzendanner and Soltis, 2000