

Biol 415 Quiz #1 Study Outline

Mechanisms of Evolution

- What is evolution, macroevolution, and microevolution? *slide 4*
- What are the differences between genotype and phenotype? How are they related? *slide 4*
- What are the major evolutionary agents? *slide 5*
- What is gene flow and how does it affect populations? *slide 6*
- What is genetic drift and natural selection? What do they do to a population? *slide 7-8*
- What is inbreeding and outbreeding depression? *slide 9*

Genetic Drift (Dlugosch and Parker 2008)

- What's the difference between assortative and disassortative mating? What is the implication to genotype and allele frequencies for them? How might it occur? *slides 4-8*
- What is inbreeding depression? What causes it? What prevents it? *slides 9, 13*
- What does inbreeding do to genotype or allele frequencies? *slides 9-11*
 - How do we measure inbreeding? *slide 12*
- What is genetic drift? *slides 15-16*
 - What affects the amount of drift that occurs and why? Especially why population size matters. *slides 17-18*
- What is effective population size? *slide 19*
- What affects the effective population size and understand why each does. *slides 19-20*
- What effects the severity of a founder effect and why? *slide 22*
- What happens to allele frequencies during drift? What is the probability of an allele being fixed by drift? *slides 23-24*
- What does theoretical critical value ($4N_e s$) indicate? *slide 26*
- How does drift act within populations and among populations and why? *slide 27*
- What does F_{st} represent and how is it measured? *slide 29*

Gene Flow (Ellstrand 2014)

- What is gene flow, what does it do to populations? *slide 4*
- How does gene flow occur in plants? *slides 5-8*
- How do you measure gene flow?
 - directly? what are the shortcomings of each method? *slides 10-14*
 - indirectly? What are the caveats? *slides 15-17*
- What are the different implications of seed versus pollen dispersal? *slides 18-20*
- How does gene flow influence species cohesion? *slides 22-23*
- How does selection affect the spread of a mutation? *slides 24-31*
- Why would gene flow reduce inbreeding depression? *slide 33*
 - Cause heterosis? *slide 34*
 - Cause outbreeding depression? *slide 35*
- Gene flow and transgenics. How would you test if a transgene would spread? *slides 37-39*

Phylogeography (Sork *et al.* 2016)

- What is phylogeography? *slides 4-7*
- What influences spatial patterns of genetic variation? *slides 8-9*
- What is reticulate evolution? Does it occur? *slide 10*
- What's the difference between population genetics, phylogenetics and phylogeography? *slides 11-12*
- What are the pros and cons of using mitochondrial, chloroplast or nuclear DNA for phylogeography? *slide 13*
- Be able to read haplotype networks and when combined with a geographic map be able to postulate forces causing that pattern. E.g. gene flow, vicariance, long distance gene flow, mutation, incomplete lineage sorting, fragmentation. *slide 14-23*
- What is the ABBA-BABA test? What do we expect without gene flow and why? What is the result when there is gene flow? *slides 24-31*
- What is coalescent theory? What is it used for? What does MRCA stand for? *slides 32-34, 39-40*
- What is model based phylogenetics? What are the four steps? How is it better than previous methods? *slides 35-38*