Study questions for week 5

• What is inbreeding depression? What are it’s causes?
  Inbreeding depression occurs when inbreeding in small populations reduces heterozygosity and fecundity and increases mortality through expression of deleterious, recessive alleles.

• Why do some self pollinating plants do not show the effects of inbreeding depression? How do other plants avoid it?
  Some self pollinating plants which have been inbreeding for a long time, have managed to purge detrimental genes of small or large effects. Hence they do not show effects of inbreeding.
  Some plants avoid inbreeding by
  2. Male and female parts flower at different times.
  3. Heterostyly
  4. Male and female flowers on different plants.

• Explain the concept of Extinction vortex.
  Small populations show the effects of inbreeding depression, decreased heterozygosity and fecundity and increase in mortality. These factors, often working in concert, tend to further reduce population size and drive the species toward extinction. This trend is known as the extinction vortex.
  van Dyke pg. 151 + lecture slides

• What is outbreeding depression?
  The decline in fitness that occurs when individuals from normally inbreeding populations breed with individuals from other populations of the same species, breaking up uniquely coadapted genetic combinations or produce heterozygotes that are mal-adapted to specific environments, for example plants growing on heavy metal soil are adapted, crossing these plants with others of the same species that are not growing on these soils will produce less vital heterozygotes.
  van Dyke pg. 395, 156-157

• What is PVA? how is it used?
  PVA is a way of quantitatively predicting the future of a population or species. Uses are:
  1. Assessment of extinction risk
  2. Guiding management
     (a) Identifying key life stage for protection as management targets.
     (b) Determine number of individuals needed to establish a new population.
     (c) Setting limits on harvest.
     (d) Determine size of a reserve.
What are F-statistics? What do they measure?
F-statistics measure population structure.
1. $F_{IS}$ measures whether there are fewer or more heterozygous individuals than expected in a subpopulation
2. $F_{ST}$ measures degree of genetic differentiation among subpopulations