

Study guide for speciation, classification, DPS, inbreeding, F statistics.

1. Define "species". For full credit, provide more than one definition and explain the complexities that different definitions of species wrestle with. How does the application of different definitions affect conservation planning?
2. Describe, step-by-step, the process by which allopatric speciation works. Be sure to explain each of the major factors that determine whether or not speciation will occur when a single population becomes two allopatric populations.
3. Explain mechanisms of reproductive isolation, with an example of a pre-zygotic and a post-zygotic isolating mechanism. Which type of isolation is reinforced once allopatric populations become sympatric? Why?
4. Explain cladistic classification. What is the major strength of cladistic classification? What is a monophyletic group? A paraphyletic group? Give an example of the problems that can arise for classification of major taxonomic groups if classification is entirely based on cladistic methods.
5. Define "ESU". Explain Crandall et al.'s 'crosshair' method of analyzing whether or not a population is an ESU. What problems with prior definitions were Crandall et al trying to correct? Relate these issues to the Department of the Interior's DPS policy and to Allendorf's six 'cases' to guide conservation policy when hybridization occurs.
6. Give an example of a case study for which there has been debate, based on genetic evidence about hybridization, as to whether or not a certain taxonomic group should be protected. Based on the debate, what policy would you recommend?
7. Algebraically define each of the three fixation indices or F-statistics. In words, what does each one measure?
8. What is inbreeding? How do F stats measure inbreeding? How do F stats (F_{is} , F_{it} and F_{st}) relate to the value of F from pedigree analysis? What is inbreeding depression? How is it measured? What do recent reviews suggest about the effects of inbreeding in the wild?