

Biology 205
Dr. Kilburn, Fall 2002
Study guide - Geographic ecology

1. Define geographic ecology. Describe the general relationship between species richness on islands/habitat fragments and the area and isolation of those islands/fragments. What process(es) explain(s) the relationship? Is the pattern of the relationship the same for all groups of organisms and all islands? Use results of individual studies to support your answers.
2. Describe MacArthur and Wilson's equilibrium model of island biogeography, being sure to explain the precise meaning of each of the variables involved and how those variables are expected to change with island area and distance from source populations. Be able to represent the model graphically and identify equilibrium points.
3. What key prediction does the equilibrium model of biogeography make about species composition on islands (and why)? Is the prediction met? Defend your answer using evidence from Diamond's and Wilson and Simberloff's studies (be sure to describe the studies themselves!).
4. What is the general relationship between species richness and latitude? Describe the "time since perturbation", "productivity", and "favorableness" hypotheses for this pattern, including the reasoning behind each and any weaknesses each may have. Describe Rosenzweig's land-area hypothesis for this pattern, being sure to address how he thinks area affects both speciation and extinction rates. How has his model been tested? What have been the results?
5. Use the exceptional patterns of plant species richness in the Cape Floristic Province of south Africa and tree species richness in eastern Asia to discuss the roles of history and geography in producing patterns of species diversity that do not conform to the simple area/isolation model. For each, be sure to describe the pattern and explain its historic and geographic causes.