

Review questions for Kitajima's lectures

1. Define alpha, gamma, and beta diversity, and explain their relationship by one equation.
2. Briefly (one sentence each), summarize how biological diversity changes at local-regional scales in relation to the following environmental gradient.
 - a. Latitude
 - b. Altitude
 - c. Annual precipitation
 - d. Soil fertility
 - e. Frequency and intensity of disturbance
 - f. Direction of ocean current
3. Why did Paul Richard, one of the most eminent tropical ecologists of this century, say "Africa is an odd man"?
4. What are some of the similarities between coral reefs and tropical rain forests that may explain their high biological diversity?
5. Explain how the theory of island biogeography may provide useful implications for community ecology of fragmented habitats.
6. What is a metacommunity? How does this concept help understand alpha diversity?
7. Explain the area hypothesis proposed by John Terborgh.
8. Explain the idea that high pest pressures contributed to the high biological diversity in the tropics, using herbivore-plant interactions as examples.
9. Explain the Janzen-Connell model and the intermediate disturbance hypothesis.
10. Give five examples of mutualism that are found primarily in tropical ecosystems.
11. Evaluate the following generalizations.
 - a. Tropical forest consist of competitively stable, highly coevolved sets of niche-differentiated species, each of which is sufficiently distinct in its resource and microhabitat requirement to allow its persistence in the community.
 - b. The high species richness of the tropics derives, in part, from its climatic stability and hence continuous development, while the temperate regions have experienced a series of drastic climatic changes leading to widespread extinction.
12. Evaluate the list of "minerals for thoughts" (handout for February 11). Are they true, mostly true with exceptions, sometimes true, or basically false?
13. List three of the macronutrients and three micronutrients for plants, and explain how they function in biological organisms.
14. Explain in what kinds of chemical forms silicon is found in soil and plants.
15. Define resorption efficiency and proficiency? Why do they matter for nutrient conservation?
16. Define mycorrhizae, then explain the two major types of mycorrhizae and their differences in form and function.