

Exam 3

Terms:

Chapter 13. Competition; Lotka-Volterra model; zero-growth isocline; pre-emptive, consumption, overgrowth, encounter competition; allelopathy, terrestrial competition; competitive exclusion principle; ecological niche; fundamental niche, realized niche; niche overlap; competitive release; niche partitioning; character displacement;

Chapter 14. Predation, carnivory; parasitoidism; herbivory; parasitism; cannibalism; functional response, numerical response; Type I, II and III responses; search image; aggregate response; optimal foraging strategy; cryptic coloration; flashing coloration; aposematic or warning coloration; Batesian mimicry; Mullerian mimicry; predator satiation; constitutive defense; induced defenses; structural defenses; secondary compound; quantitative defense

Chapter 15. Symbiosis; parasitism; parasite; host; infection and disease; micro-parasite; macro-parasite; ecto-parasite; endo-parasites; Holoparasite; Hemiparasite; direct transmission; intermediate organism or vector; definitive host; intermediate host; inflammatory response; immune response; antigen; commensalisms; mutualism; lichen; mycorrhizae; pollination

Chapter 16. Community, Species Richness, relative abundance, evenness, Simpson's index (D), dominants (species), keystone species, basal species, top predators, trophic levels, guild, zonation, individualistic or continuum concept of communities, organismic community.

Chapter 17. Null model, diffuse, food web, food chain, keystone predation, apparent competition, indirect commensalisms, functional groups, bottom-up control, top-down control

Chapter 18. Succession, seral stage, primary succession and secondary succession, autogenic and allogenic environmental change, chronosequence or chronose, intermediate disturbance hypothesis, paleoecology

Sample essay questions:

- 1) Competition can be understood as six different types of interactions, depending on the mechanism of competition that is involved. List and describe 3 of these types of competition, giving an example for each.
- 2) Using a graph of the Lotka-Volterra competition model for two species, show how the outcome of competition between two species can depend on differences between the carrying capacities of two habitats.
- 3) Describe the competitive exclusion principle, including its major assumptions, and give an example of scientific studies that have provided support for it.

- 4) Describe the difference between fundamental niche and realized niche, including the importance of competition in influencing them.
- 5) List and describe three different types of predation. How are they similar and how are they different from each other?
- 6) What is the main prediction of the simple Lotka-Volterra equations of predator-prey interactions? Is this prediction realistic? Does it fit with our observations of predators and prey in nature?
- 7) Describe the differences between the three types of functional responses, using a graph. How can one of them lead to regulation of prey populations by predators?
- 8) Describe three different types of defenses that prey have evolved against predators, and give an example of each.
- 9) Describe two qualitatively different modes of transmission of a parasite between hosts, using examples to illustrate each mode.
- 10) Use an example to illustrate the fact that parasites can impact both the survival and reproduction of their hosts.
- 11) Give two examples of mutualisms involving the transfer of nutrients.
- 12) Draw a graph that illustrates the impact of one species on the carrying capacity of another, according to the Lotka-Volterra models of mutualism.
- 13) Use examples to illustrate the difference between a dominant species and a keystone species.
- 14) Draw a diagram of a simple food chain with three trophic levels, and briefly describe the feeding relationships among them.
- 15) Use an example to illustrate the fact that parasites can impact both the survival and reproduction of their hosts.
- 16) Explain what an indirect interaction is, and give one example of an indirect interaction that has a strong effect on certain species in a community.
- 17) Explain the difference between bottom up and top down control of community structure. Do you think one or the other is most important, or some combination of both? Why?
- 18) Describe the response that plant communities typically exhibit when nutrients are added, and summarize the prevailing hypothesis to explain this response.

19) Briefly summarize the differences between the facilitation model, the inhibition model, and the tolerance model of succession as proposed by Connell and Slatyer in 1977. Which of these models place importance on autogenic environmental change?

20) Describe an example of an important allogenic environmental change that drives succession.

Answer:

21) Explain the difference between the organismal concept of communities and the individualistic continuum concept. Which do you think most accurately describes real communities and why?