Biology 1C Fungi and Ecology Exam (3)
Study Guide

Following is a list of questions and topics. Using the book and your notes from class, be able to answer all of them. I will pull from these (modified) for the exam. I suggest you spend some time in small groups talking about the questions, and attend SI sessions! I will not pull any surprises on you (eg. I won’t ask a question on the test that is totally unrelated to any here).

Fungi:

- What are some of the general traits of the fungi?
- What major ecological role do many of them play? What other ecological roles (eg. parasites etc.)
- Know what hyphae are and what the mycelium is and what it does
- In many fungi, what is the actual structure that we see above the surface, and what is its primary role?
- Define coenocytic and septate hyphae
- Describe a lichen (its mutualistic association)
- What are mycorrhizae? What are two major kinds?
- Be able to draw the generalized fungal life cycle, and know how each of the four phyla relate and/or are different from it (I may ask questions about key differences)
- In addition to the general life cycle, also know the specifics of the life cycle of a basidiomycete and an ascomycete.
- Know some distinguishing features of each of the four fungal phyla (eg. the chart in your book and in the powerpoint handout I handed out)

Ecology: be able to give examples!

- What are the ‘subfields’ of ecology (population, ecosystem, community, organismal)
- What are the key abiotic factors that define aquatic (oceanic) biomes?
- List two specific biotic factors that can define community structure (eg. Zonation in the intertidal)
- What is eutrophic mean? Oligotrophic? How are dead zones formed?
- What is a limiting factor? Describe one, and its significance
- What are the two primary defining abiotic factors that describe a biome? What biotic community generally describes a biome? (eg. Plants). Be able to describe some specific biomes, with the understanding that latitude and altitude play a role
- What are Hadley cells?
- What are the more regional factors that can explain biome distribution (ocean currents, rain shadows etc.)
- Know the difference between eastern and western boundary currents
- List some factors that could determine/explain the range of a population or species.
- What is meant by the ‘law of tolerance’? Give an example. What is acclimation vs. Threshold?
• Give an example of an ecosystem that has high primary productivity, and one with low
• What contributes to highly fertile soil?
• Describe the nitrogen, carbon and phosphorus cycles (examples of them). What are three major pools where elements are accumulated (eg. living, non-living, and storage reservoirs). Know that decomposition rates have an important role in determining rates of nutrient cycling. Also, most biogeochemical cycles have a gaseous and a non-gaseous (eg. solid) component of the cycle. Describe how one of these cycles (and an alteration of it) might affect an ecosystem
• Nitrogen cycle: nitrogen fixation, ammonification, nitrification
• Atmospheric and soil components to each cycle
• What is biomagnification? Why does it mostly affect high order predators? Give an example.
• When considering species diversity in an ecosystem, what two aspects of the species assemblage is it important to consider (eg. relative abundance and species richness). Give an example.
• What does functional group diversity mean?
• List three things that can lead to high species diversity (eg. habitat heterogeneity, interspecific competition, tolerance levels to abiotic factors, functional group diversity, intermediate disturbance to the system…). For each, explain how
• Give an example of resource (niche) partitioning
• Know what character displacement is
• What is a keystone species? Give an example of what might happen in a community if a ‘keystone’ species is removed.
• What are other ‘species with large impact’ such as indicator species, ecosystem engineers (foundation species) and dominant species?
• Give examples of interspecific species interactions. For each, describe the effect of the interaction on each species (eg. parasitism, predation, mutualism, commensalism).
• Give an example of competitive exclusion (and the CEP)
• What two main outcomes does the competitive exclusion principle predict will happen when two species attempt to occupy the same niche?
• List two effects competition can have on a species assemblage (eg. one dominant species – low species diversity, resource partitioning-high species diversity, genotypic differences – speciation, etc.).
• What likely effect would large episodic (infrequent) disturbances have on species diversity?
• What does the intermediate disturbance model predict about disturbance and species diversity? Why?
• What is the dynamic stability hypothesis? (long food chains are unstable). What type of food chain could be predicted in an unpredictable or disturbed environment?
• What type of system energetics would predict long food chain length (high energy input)? What kind of food chain is most unstable (long)? Why?
• What is a sere? What are the general characteristics of organisms that form early successional seres (r-selected, rapid colonizers etc.) compared with late ones?
• What is the difference between primary and secondary succession
• Why is patchiness (in terms of disturbance such as patches in a forest) important in promoting succession and recovery?
• What type of sere is likely to have high species diversity? Why?
• What are some characteristics of ‘mature’ seres compared with early ones.
• Compare top down and bottom up forcing as factors that drive community structure
• What is a trophic cascade? Be able to give a specific example of how this dynamic can alter an ecosystem (eg. the killer whales and the wolves)
• What (specifically) is driving the collapse of the kelp forest ecosystem in the Aleutian islands? Be able to give some historical background too.
• Explain what Biogeography means. How is biogeography different from phylogeography?
• What characteristics of islands would predict the highest diversity? Why?
• Define gross and net primary productivity
• What is net community productivity?
• Be able to discuss why up to 90% of energy is lost at each trophic level (where does it go?), and how/why this translates, in general, to low numbers and biomass at very high trophic levels
• What are some explanations to inverted biomass pyramids such as in the English channel or the ocean? (low standing crop and high turnover – know these terms too).
• Know how to read a biomass, energy and numbers pyramid.
• What is secondary production?
• What is production efficiency (be able to calculate this – see book example)?
• Define endemic, native and introduced species
• What is a disjunct distribution?
• Why is the world so green?