

Chan's ENVS200 Review

Chapter 6 - Interspecific Competition

ECOLOGICAL EFFECTS OF INTERSPECIFIC COMPETITION

- Interspecific competition - when individuals of one species suffer a reduction in fecundity, survivorship, or growth as a result of either exploitation of resources or interference by individuals of another species
- More efficient exploiters of resources exclude less efficient ones (seen in the case study with plankton)
- Usually, competing species will exist in the same spatial scale (a stream) but have distinct zones (near the top of the water, near the bottom of the water)
- Other species competing means that they might be pushed out of regions where they may originally have been able to live (this is the concept of fundamental vs. realized niches)
- Fundamental niche - where it could live in the absence of interference and competition
- Realized niche - where it actually lives
- Niche differentiation - where species move into their own realized niches when competition occurs
- Differential resource utilization - coexistence through utilizing resources in slightly different ways
- Competition exclusion principle
 - if two competing species coexist, it is because niche differentiation
 - if there is no differentiation, one competing species will eliminate or exclude the other
 - only applicable if the environment is stable
- Colonization-competition tradeoff
 - Usually an organism is either better at spreading out (colonization) or excluding others from a given niche (competition)
 - Seen in the ants-in-the-trees example

EVOLUTIONARY EFFECTS OF INTERSPECIFIC COMPETITION

- Ecological release - response to the absence of ecological effects of other species
- Sympatry - living in the same place
- Hard to conduct experiments that show evolutionary effects as the time needed for effects to show
 - Experiments of this type are usually only conducted using bacteria or other microorganisms
- Evolutionary effects change organisms to be less competitive with each other, giving higher chances of survival

INTERSPECIFIC COMPETITION AND COMMUNITY STRUCTURE

- Species diversity increases as the number of resources at physiologically limiting levels increased
- Niche complementarity - the tendency for coexisting species to occupy a similar position in one dimension (e.g. altitude) but differ in another (e.g. diet)
 - Two types of mice live in the same field but eat different types of grasses is an example
 - Usually affects guilds
- Guild - group of species that exploit the same class of environmental resource in similar ways
- Time can be a valid partition to reduce competition
 - Two species of mantids have life cycles that are 2-3 weeks apart, which reduces competition between the two

HOW SIGNIFICANT IS INTERSPECIFIC COMPETITION IN PRACTICE

- Connell found 90% of studies showed some interspecific competition
- To test - start off with null model (how data would look without interspecific competition)
 - Compare with actual data, see if there is a statistically significant divergence
- Null models show that spacing of groups within communities that compete are usually farther away than if they had been randomly distributed