

Chan's ENVS200 Review

Chapter 7 - Predation, Grazing, and Disease

WHAT DO WE MEAN BY PREDATION?

- Predator - anything that consumes all or part of another living organism
 - True predator - kill their prey pretty much after attacking them, consume many prey items throughout the course of their life (bears, spiders, birds)
 - Grazer - attack but don't usually kill prey, consumes only a part of the organism (cattle, deer, leeches)
 - Parasites - consume only part of each prey item (called their host), usually don't kill prey in the short term, have only a small number of prey items in their lifetime (tapeworms)
 - Parasitoid - flies or wasps who lay eggs in other beings, and the hatched larvae consume the insect host
- Prey - an individual that may be consumed (and killed) by a predator

PREY FITNESS AND ABUNDANCE

- Usually predation reduces fecundity, survival, and growth of the prey

THE SUBTLETIES OF PREDATION

- Grazers and parasites usually don't outright kill a prey, they just make it more susceptible to dying other ways
- Some prey can compensate themselves after being preyed upon
 - e.g. removal of leaves from a plant opens up other leaves to receive sun
 - e.g. removal of parts of plant stimulate undeveloped buds to grow
- Sometimes, some species are more fit WITH predation than without
 - Radishes preyed upon by caterpillars produced more seeds than undamaged radishes
- Since predators usually prey on either the old (who've already reproduced) or the young (who have not yet reproduced), the damage to a population may be less than it could be

PREDATOR BEHAVIOUR: FORAGING AND TRANSMISSION

- True predators and grazers usually forage
 - Move around within their habitat to search for prey
- Some predators "sit and wait"
- Parasites/pathogens are "transmitted" rather than foraging, based upon hosts contacting each other rather than the predator itself moving around
- Foraging "efficiency" or "effectiveness" is based on net energy intake - difference in energy gained by finding food vs. the effort put in to get it
- Predators with short handling (killing, retrieving) time vs. search times are generalists (pigeons)

- Predators with long handling times vs. search times are specialists - focus their efforts on foods that are the most bang for their buck (lions)
- All else being equal, the more unproductive the environment, the more of a generalist a predator needs to be in order to survive

POPULATION DYNAMICS OF PREDATION

- Population dynamics of predation are cyclic
 - Start with lots of prey -> a lot get eaten -> less prey -> less food for predators -> prey can thrive again -> etc etc
- However this is a pretty simplified model, and you have to ignore a lot of stuff to show this kind of thing in experiments
 - Coupled oscillations does not imply a direct predator-prey relationship
- Consumption rates for an individual predator decline with increasing predator density
- Metapopulation - when an overall population is divided into patches, as “a population of lions” doesn’t mean that all lions act as one single lion blob
 - Differences in subpopulation leads to population dynamics within subpopulations
 - Many variations in how predators/prey are spread out in a habitat can affect predator-prey relationships
 - More subpopulations and high dispersal rates means that “spikes” or “valleys”, or otherwise large changes in the population are rarer

PREDATION AND COMMUNITY STRUCTURE

- A force acting on a community is a disturbance
- Predators in a community may promote the coexistence of multiple species through reducing their numbers to a point where competition is negligible
 - This is known as predator-mediated coexistence
- Number of species is usually greatest at intermediate predation
- This suggest that selective predation should allow for more diversity in species as long as the thing that is preyed upon would otherwise be the dominant species
- However when there is no dominant species, increased predation simply leads to decreased population diversity