

Community Ecology Fill-In Notes

Topic 8.5: Community Ecology

- ★ **Learning Objective ENE-4.A:** “Describe the structure of a community according to its species composition and diversity.”
- ★ **Learning Objective ENE-4.B:** “Explain how interactions within and among populations influence community structure.”
- ★ **Learning Objective ENE-4.B:** “Explain how community structure is related to energy availability in the environment.”

What is An Ecological Community?

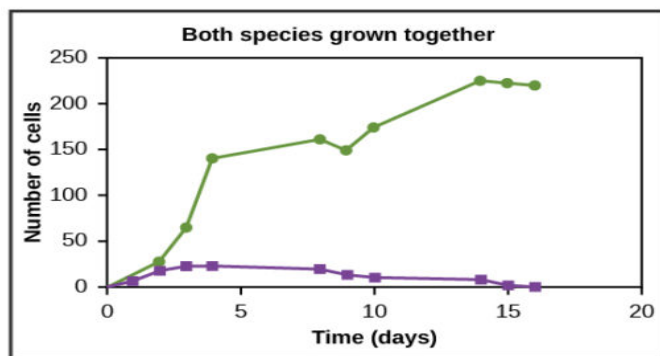
Ecological communities are comprised of _____



- “The structure of a community is measured and described in terms of the species composition and species diversity.” Pg 159 of the AP Biology CED

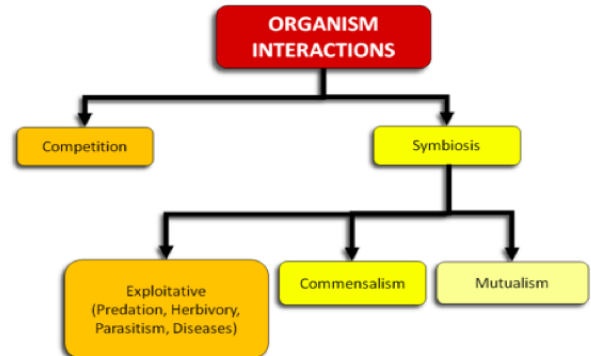
→ _____

Community Interactions



Competitive Interactions

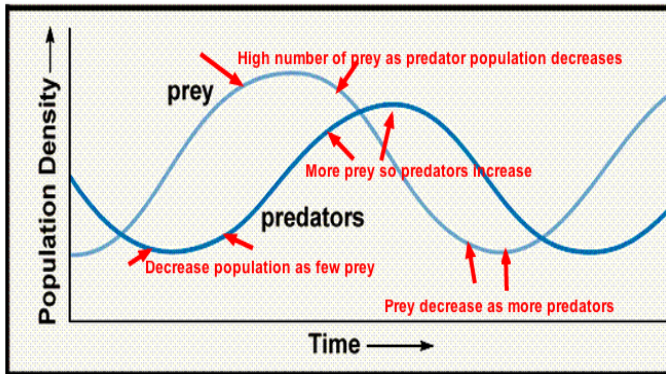
- ★ Competitive interactions among populations are characterized by _____
- _____
- members of the same population OR members of separate populations.
- ★ Competition is generally considered a -/- interaction between organisms.
- ★ Those species that outcompete the other better survive and pass on their traits, and are more likely to occupy a biological niche.



Symbiotic Interactions

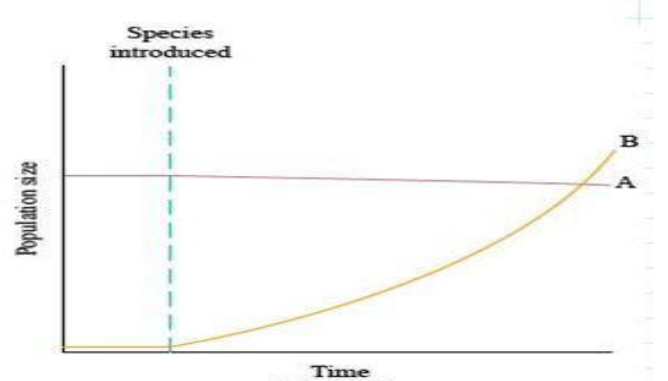
- ★ Symbiotic Interactions are described as _____
- _____
- _____
- ★ There are four types of symbiosis:
 1. Predation (+/-)
 2. Parasitism (+/-)
 3. Mutualism (+/+)
 4. Commensalism (+/0)

Exploitative Relationships



Predation (+/-)

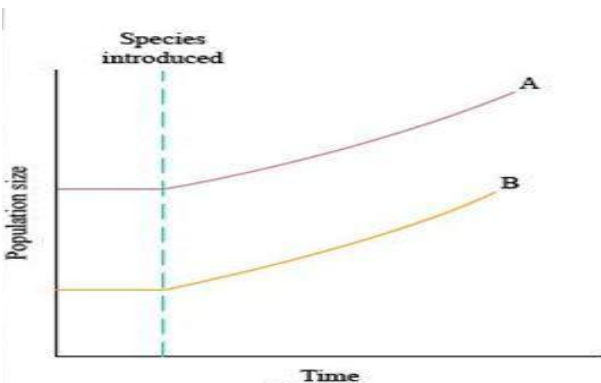
- ★ Predators _____
_____ in order to get energy and nutrients.
- ★ Herbivores eat plants to obtain nutrients and energy
- ★ Predator/prey relationships can be graphed (as seen above). Predator population is directly impacted by the prey population, and there is generally some lag time between prey and predator population growth.



Parasitism (+/-)

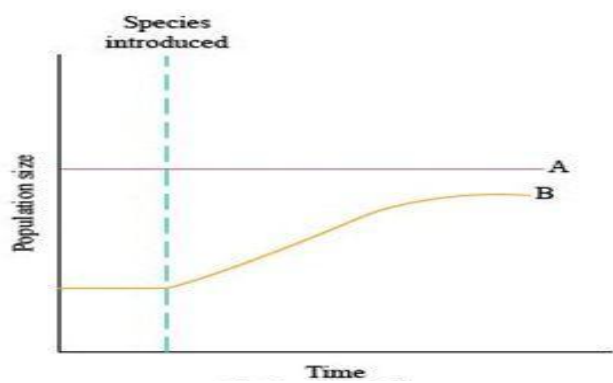
- ★ Relationship in which one organism _____
- ★ Parasites benefit, the host is _____
- ★ Exception: Reproductive parasites often kill their hosts as part of their life cycle
- ★ Parasitic relationships can also be graphed. They are characterized by a small drop in population size for the host and a gain in population size for the predator.

Non- Exploitative Relationships



Mutualism (+/+)

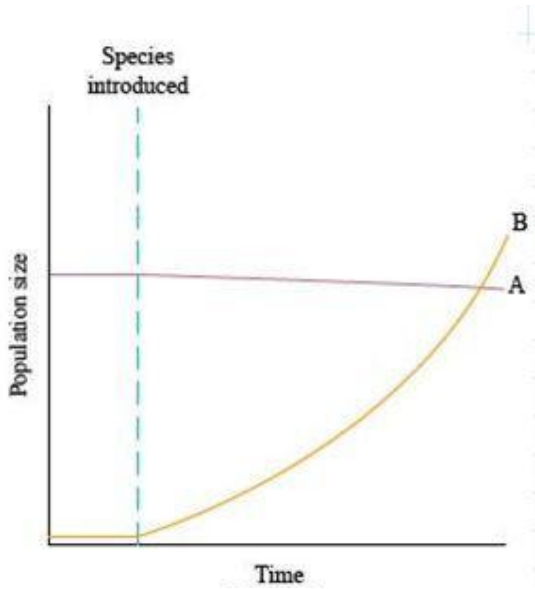
- ★ Mutualistic relationships are characterized by the fact that _____
_____ from the relationships. generally some lag time between prey and predator population growth.
- ★ Graphs showing mutualism are characterized by a gain in population size for both organisms involved in the relationship. This is because mutualistic relationships allow both organisms to gain access to resources.



Commensalism (+/0)

- ★ Commensalistic relationships are characterized by _____
_____ (neither harmed or helped).
- ★ There is huge doubt as to whether or not commensalism actually exists in nature.
- ★ Graphs showing commensalism are characterized by a gain in population size by one species while the other species' population size is unaffected.

Writing About Community Interactions



An ecologist is trying to study the relationship between two species: A and B. They do so by raising Species A in its own habitat and allowing the population to reach carrying capacity. AT this point, they introduce species B and measure the change in population size for both species over a period of time. **Explain** what type of relationship Species A and B share based on the graph.

Modeling Community Biodiversity

“The structure of a community is measured and described in terms of species composition and species diversity”
AP Bio CED pg 159

Simpson's Diversity Index

$$\text{Diversity Index} = 1 - \sum \left(\frac{n}{N} \right)^2$$

n = total number of organisms of a particular species

N = total number of organisms of all species

- _____ is the _____ in an ecosystem
- _____ is the _____
- The _____, the _____ a community is considered to be.
- Biodiversity can be quantified using Simpson's Biodiversity Index

Simpson's Biodiversity Index Practice Problem

An ecological survey of a nearby lake ecosystem shows the following species and their abundance. How diverse is this community?

Species	n	n/N	(n/N) ²
Brown Trout	934		
Smallmouth Bass	733		
Catfish	34		
Carp	2003		
Steelhead	234		
Northern Pikes	32		
		Total:	

Simpson's Diversity Index

$$\text{Diversity Index} = 1 - \sum \left(\frac{n}{N} \right)^2$$

n = total number of organisms of a particular species

N = total number of organisms of all species

Large Diversity Index = Very diverse

Small Diversity Index = Not very diverse