

Today you will:

- know diff. between interspecific + intraspecific
- describe symbiotic relationships
- describe predator, prey relationships + defense mechanisms
- define climax community, primary succession, secondary succession

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Population - all the members of a species in a locality at a particular time

Community - all the species in a given area

Geographic range - the region where an organism is sighted

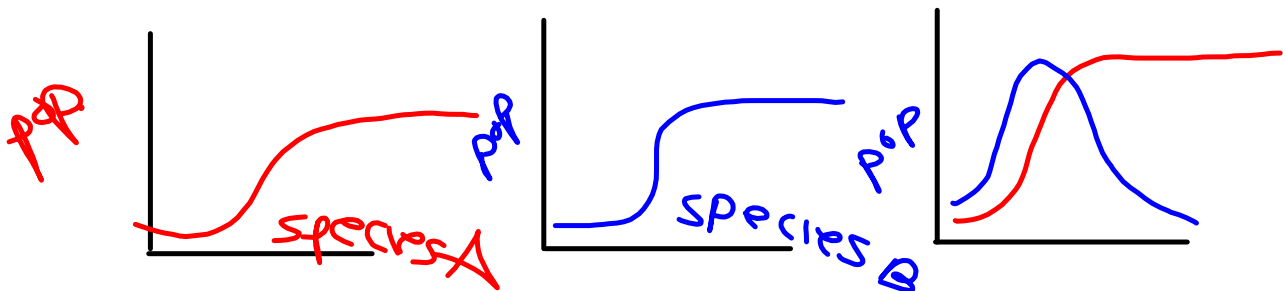
Habitat - the physical area where a speices lives (vegetation, soil, conditions, climate)

Ecological Niche - the population's role in the environment that includes biotic and abiotic factors needed to allow the species to survive

How Populations Relate to Each Other!

I: Intraspecific & Interspecific Competition and Gause:

- The Russian biologist G.F. Gause believed that if 2 populations of organisms occupy the same ecological niche, one will be eliminated
- This is known as Gause's Principle or the competitive exclusion principle
- Graph of population A, B and AB together:



Examples:

- Some plants produce *allochemicals*, which prevent seeds from its own species or other species from germinating near them. Lodgepole Pine trees have no undergrowth as a result
- Hawks and Owls eat the same food source = mice
- Instead of directly competing with each other they partition the time of day in which they hunt so that one species does not competitively exclude the other

II: Response to Predation in Predator-Prey Interactions:

Camouflage: an organisms way to blend into and hide within its environment

- termed cryptic colouration
- examples include:
 - seasonal fur colouration in Hares (white-winter, brown-summer)
 - Jackfish have light coloured bellies and dark backs to hide from predators below and above them in the water
 - “living-rock” fungus appear like pebbles to avoid predation from herbivores

Aposematic colouration: warning colouration to avoid predation

- coral snakes are conspicuous with alternating bands of red, black and yellow to make them stand out
- predators have learned to stay away from this poisonous snake and the advance colouration wards off the curious foraging predator

Mimicry: a species that has a colour pattern that closely resembles a distasteful or dangerous species

- Monarch & the Viceroy Butterfly
- Monarch tastes awful (chemicals on its coat that cause birds to vomit), is coloured with a orange/yellow pattern
- The Viceroy does not have a noxious flavour but, wards off predatory birds by adopting the orange/yellow colour of the Monarch Butterfly
- This is also an aposematic colouration example

Coevolution: when an adaptation possessed by one species puts a selective pressure on another species, directing its evolution in some way

- Arctic hares are white in winter and have long hind feet enabling it to scamper quickly on top of the snow away from the chasing lynx
- The lynx over time has developed wider paws so that it will not sink into the snow which slows it down during pursuit of a hare
- The hare responds by having an erratic leaping locomotion from side to side making it difficult for the lynx to pursue as the lynx gets caught in turns sinking deeper in the snow

III: Symbiosis: a relationship in which 2 different organisms live in close association.

Parasitism: one benefits, the other is harmed

- parasite lives & feeds on/in the host, but the host is usually not killed WHY?
- Ie// Tapeworm: absorbs nutrients while in the intestines of the host
- Mistletoe: grows on & sends its roots into the sap of the lodgepole pine tree
- Cowbird: lays it similarly colored eggs in a Robin's nest by removing the Robin eggs first. The Robin is then fooled to brood & care for the cowbird young

Commensalism: one benefits, the other is neither positively nor negatively affected.

- arctic fox & caribou:
- caribou remove the top hard layer of snow to expose the lichen in the subnivean environment below
- the fox follows the caribou taking advantage to the exposed areas to capture the mice that overwinter below the hard snow-pack
- birds & bison:
- bison consume the grass and defecate which attracts flies
- the birds that follow bison eat the flies that surround the bison
- bison benefits too since the aggravating flies are taken care of by the birds

C: **Mutualism**: where 2 different organisms benefit from the relationship between them.

- bats, bees, birds & flowering plants: the BBB's get nectar and the flower has its pollen spread to other plants from the BBB's
- lichen: a combo of fungus and blue-green algae
- the fungus provides the minerals obtained from bare rock to the algae which uses the minerals during photosynthesis to provide energy to the fungus
- clover and nitrogen-fixing bacteria

Succession In Communities:

Succession: the slow orderly, progressive replacement of one community by another during the development of vegetation in any area.

2 types:

Primary succession: occurs where no community existed previously, (not covered by vegetation).

- ie// plant life which emerges on a new volcanic island
- algae brought to small pools of water from birds feet, later mix with the minerals to form soils

B: **Secondary Succession:** follows the partial or complete destruction

- of already existing communities.
- after a forest fire, abandoned agricultural land, flood, etc
- pioneer species of plants occupy the newly exposed areas
- ie// pioneer species like: lichen, moss, weeds (fireweed, dandelion)
- able to resist intense solar radiation & low moisture
- provide a shady microclimate to developing trees that do not tolerate high sun exposure
- the decay of pioneers increases soil fertility

Succession is identified by SERAL STAGES:

- specific stages in succession identified by the dominant species present

Bare land > lichen, moss, algae > annual/biennial grasses > perennial grasses > shrubs > willows > spruce trees > aspen pine forest climax

- Each stage has unique requirements of sunlight/moisture/soil content.
- As the stages develop they enable the next stage to take root & grow
- The final stage is characterized as a climax community:

Climax community: a stable collection of species that are able to reach their biotic potential and successfully compete in the area.

Generally: species composition changes quickly during early stages

- total # of species higher near the beginning, levels off in the middle, declines toward the end

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