

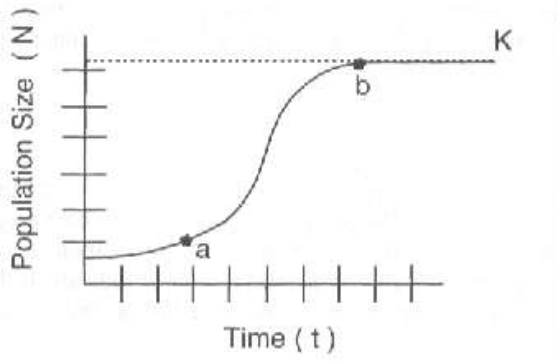


- ***Community Ecology***

# QOD



- A population of Spotted Fritillary butterflies exhibits logistic growth. The maximum population growth occurs when the population is at half its carrying capacity. If the carrying capacity is 500 butterflies and the maximum per capita growth rate is .1 individuals per month, what is the maximum growth rate of the population?



# Community structure

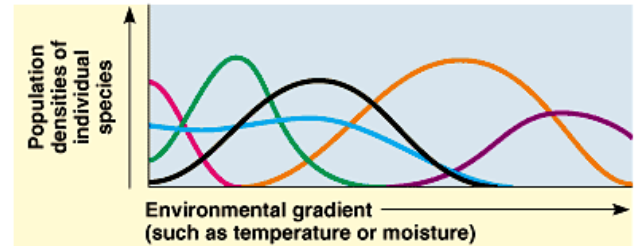
**Community** - an assemblage of populations living close enough together for potential interaction

- Species Richness – how many species
- Relative abundance – how many of each species

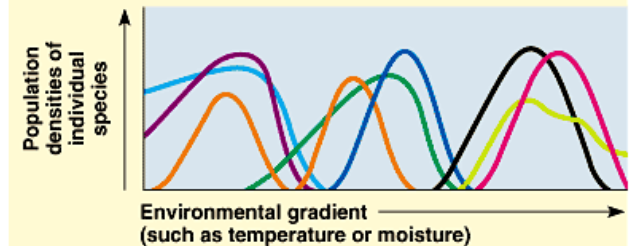
## Species diversity

### 2 competing Hypotheses:

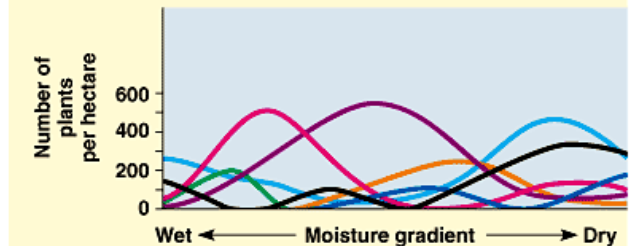
- **Individualistic** - chance assemblage with similar abiotic requirements
- **Interactive** - assemblage locked into association by mandatory biotic interactions



(a) Individualistic hypothesis



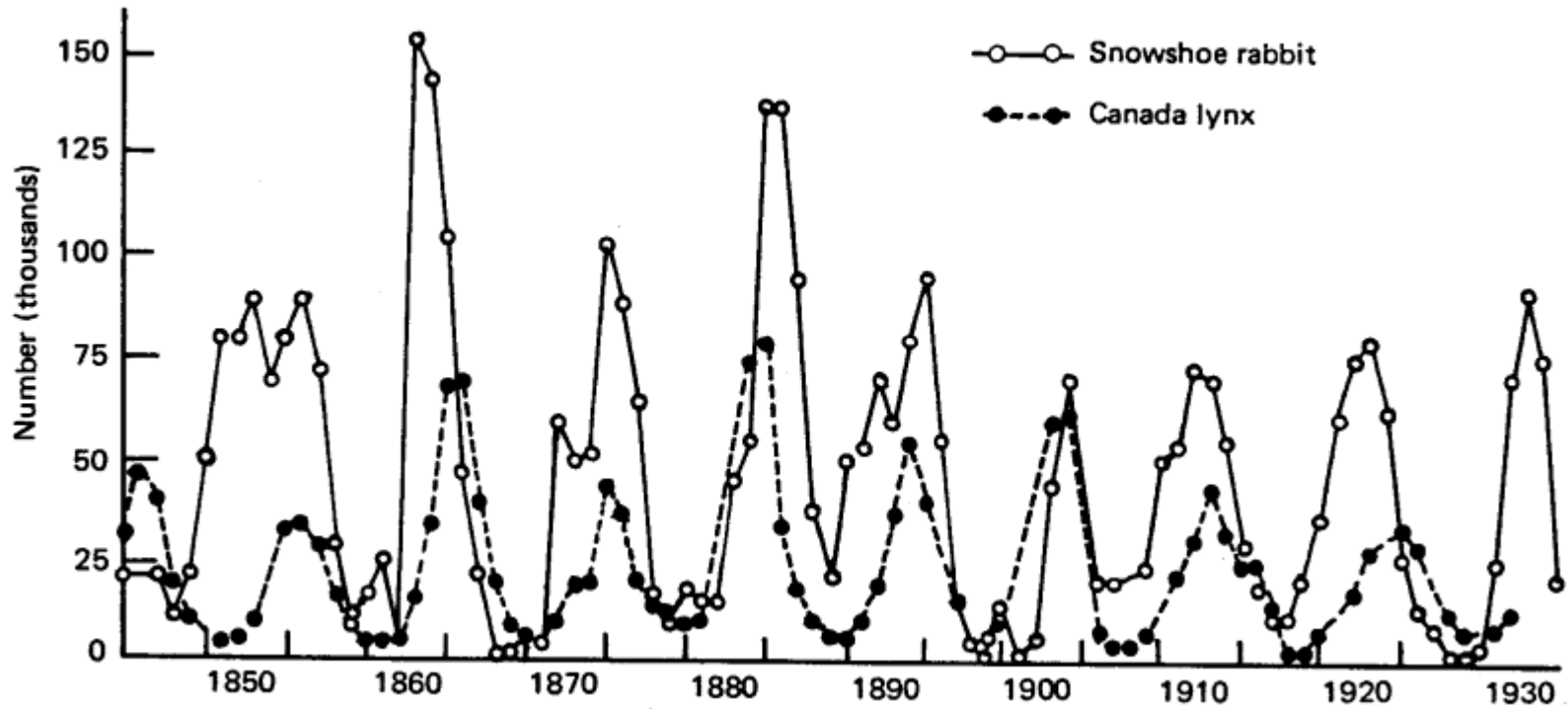
(b) Interactive hypothesis



(c) Trees in the Santa Catalina Mountains

Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

# Predator Prey Relationships



# Interactions

**Interspecific** (interactions between populations of different species within a community):

<b>Table 53.1 Interspecific Interactions</b>	
<b>Interaction</b>	<b>Effects on Population Density</b>
Competition (−/−)	The interaction is detrimental to both species.
Predation (+/−) (includes parasitism)	The interaction is beneficial to one species and detrimental to the other.
Mutualism (+/+)	The interaction is beneficial to both species.
Commensalism (+/0)	One species benefits from the interaction but the other is unaffected.

# Predation defense

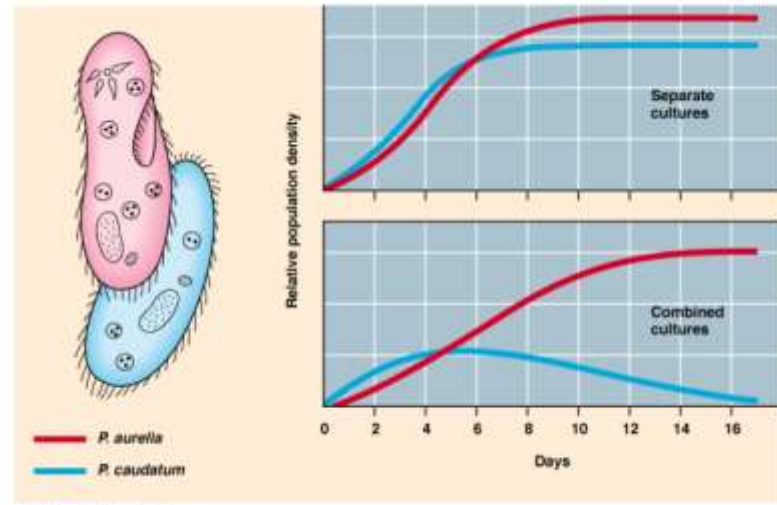
- Cryptic (camouflage) coloration
- Aposematic (warning) coloration
- Mimicry~ superficial resemblance to another species  
species **Batesian**~  
palatable/ harmless species mimics an unpalatable/  
harmful model

**Mullerian**~ 2 or more unpalatable,  
aposematically colored species resemble each other



# Competition: a closer look

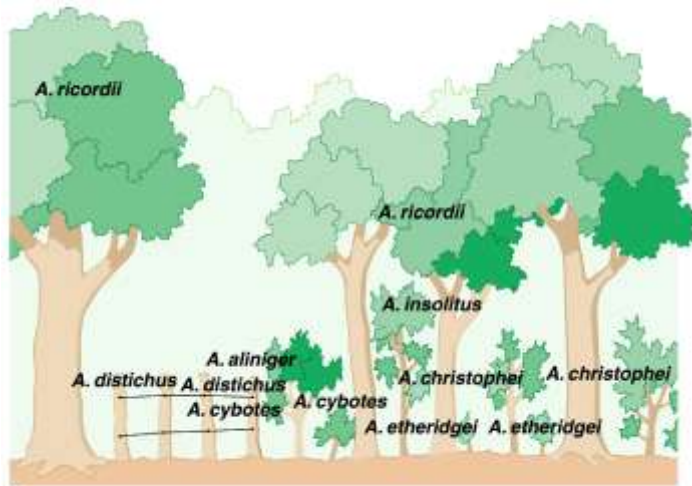
- **Interference** ~ actual fighting over resources
- **Exploitative** ~ consumption or use of similar resources
- **Competitive Exclusion Principle** 2 species with similar needs for the same limiting resources cannot coexist in the same place





# Competition evidence

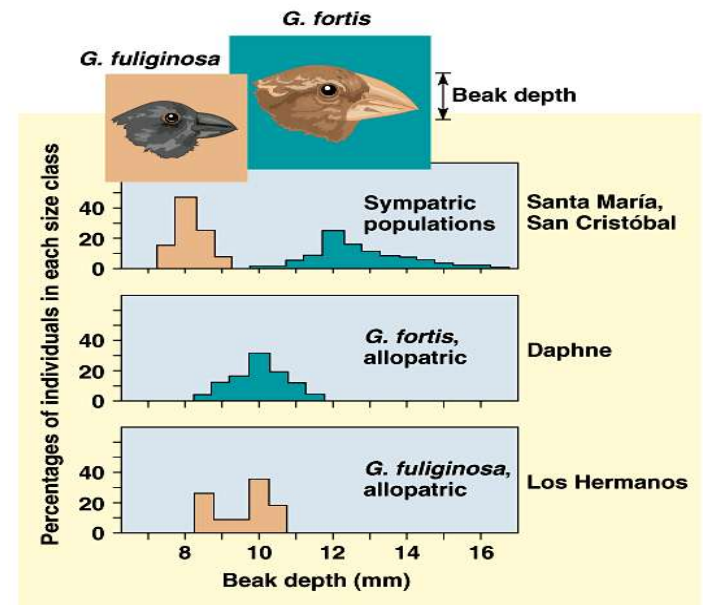
- Resource partitioning~  
sympatric species consume slightly different foods or use other resources in slightly different ways



(a)  
Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

Ex: *Anolis* lizard sp. perching sites in the Dominican Republic

- Character displacement~  
sympatric species tend to diverge in those characteristics that overlap



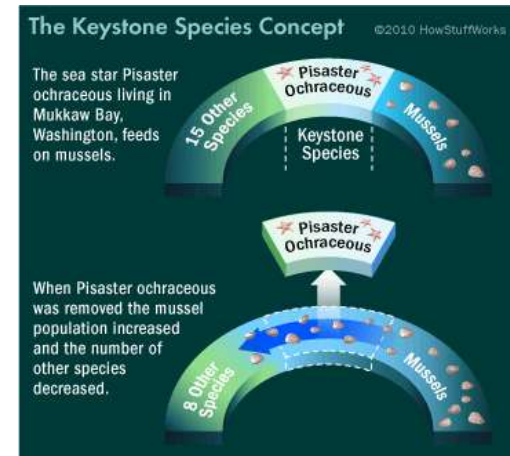
Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

Ex: Darwin's finch beak size on the Galapagos Islands



# Significant species in communities

- Dominant – important due to large numbers
- Keystone – significant in the food web
- Foundation species – forms the base on which the community is built

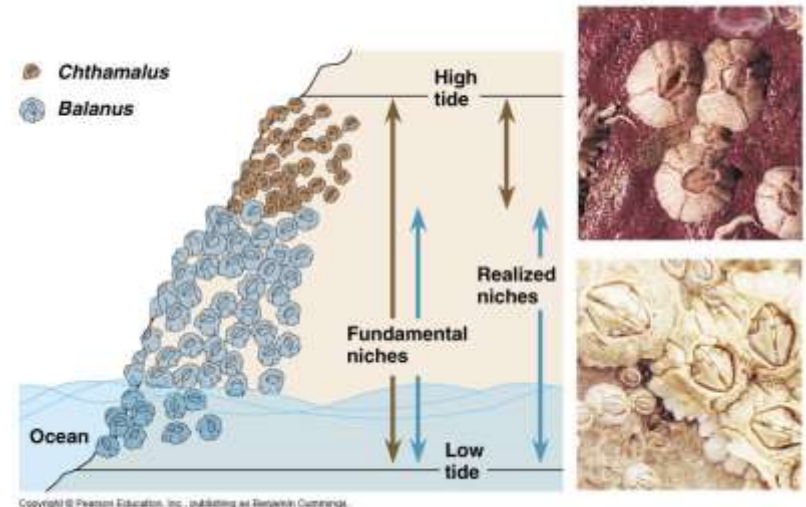


# The Niche

- **Ecological niche**~ the sum total of an organism's use of biotic and abiotic resources in its environment; its "ecological role"

**fundamental**~ the set of resources a population is theoretically capable of using under ideal conditions      **realized**~ the resources a population actually uses

- Thus, 2 species cannot coexist in a community if their niches are identical



Ex: Barnacle sp. on the coast of Scotland

# Succession

- **Ecological succession**~ transition in species composition over ecological time
- **Primary**~ begun in lifeless area; no soil, perhaps volcanic activity or retreating glacier
- **Secondary**~ an existing community has been cleared by some disturbance that leaves the soil intact

