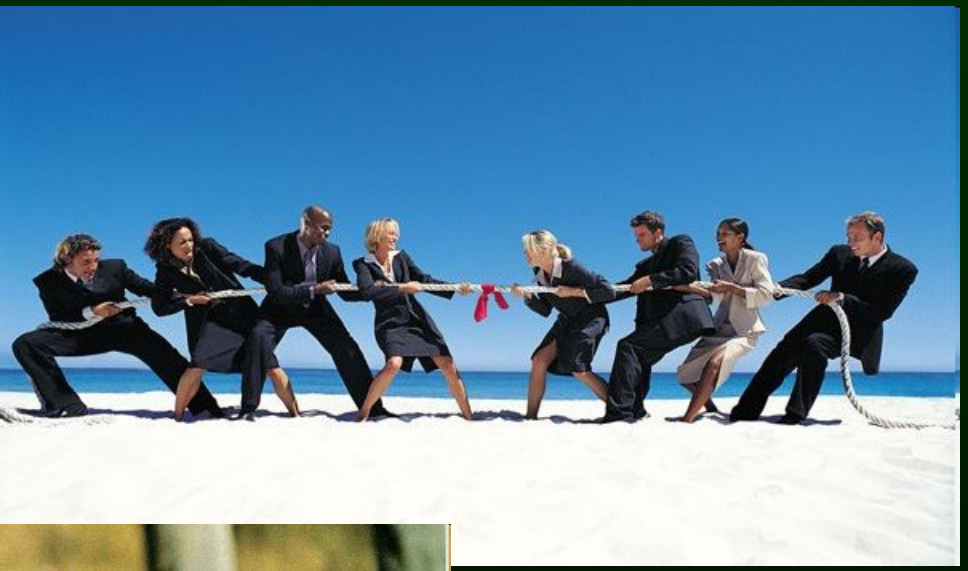
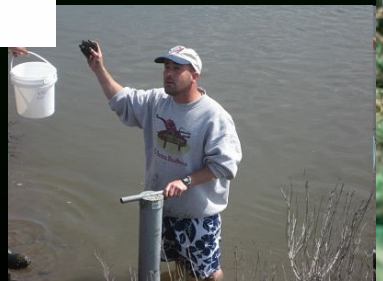
Competition

Chapter 13





Modes of Competition

- Interference:
  - Direct aggressive interaction between individuals.

- Intraspecific:
  - Competition with members of own species.

- Interspecific:
  - Competition between individuals of two species - reduces fitness of both.

Sometimes competition is obvious!

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Resource competition

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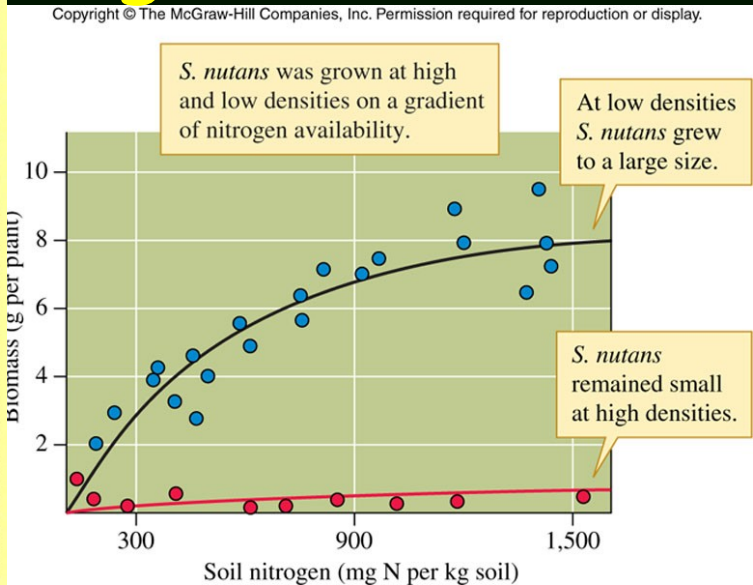
Sometimes it's not! Where is competition occurring here???

Intraspecific Competition Among Herbaceous Plants

- Plant growth rates and weights have been found to increase in low density populations.
  - Competition for resources is more intense at higher population densities.
    - Self-Thinning

Lower density = Larger individuals!

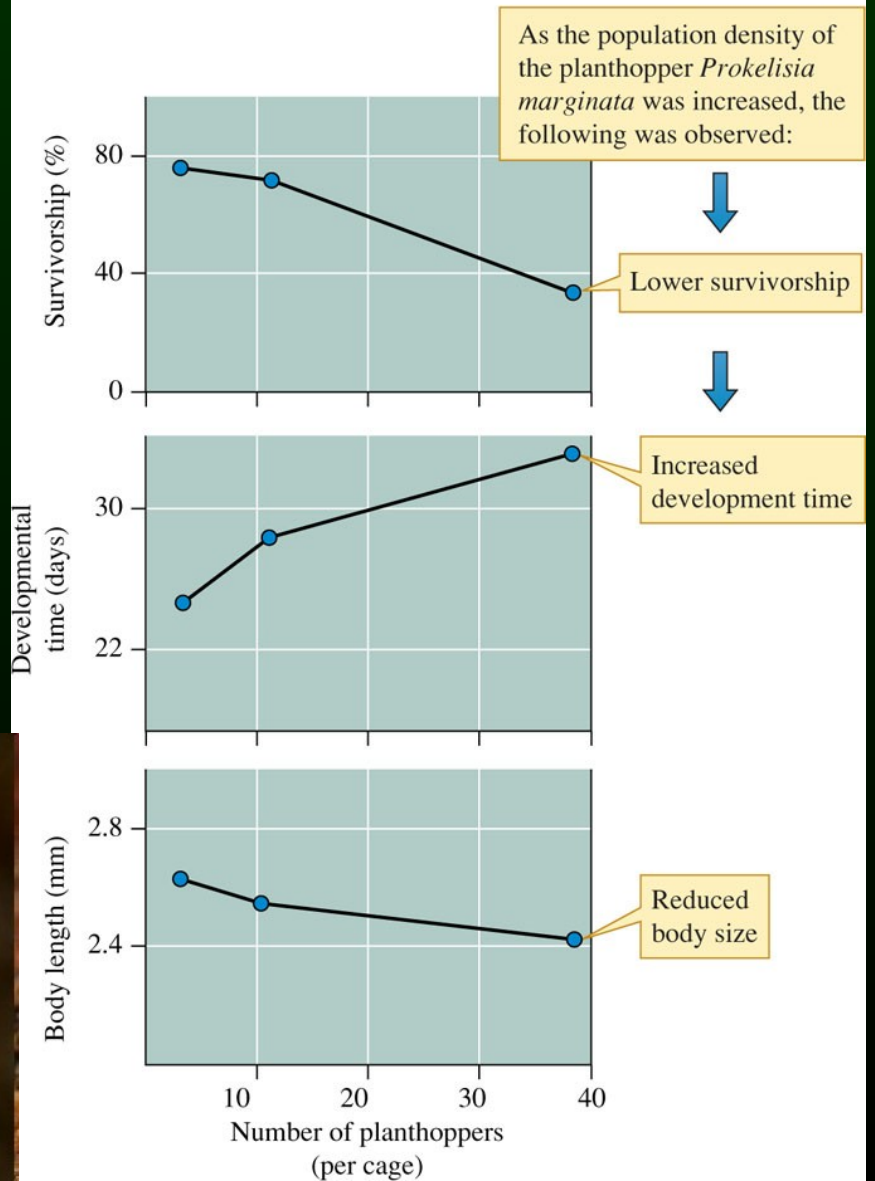
a grass



Intraspecific Competition Among Planthoppers (herbivorous insect)

Competition led to:

1. **Lower survivorship**
2. **Increased development time**
3. **Reduced body size**



Interference Competition among isopods

Adding food did nothing!!!

Higher densities led to…

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www.youtube.co
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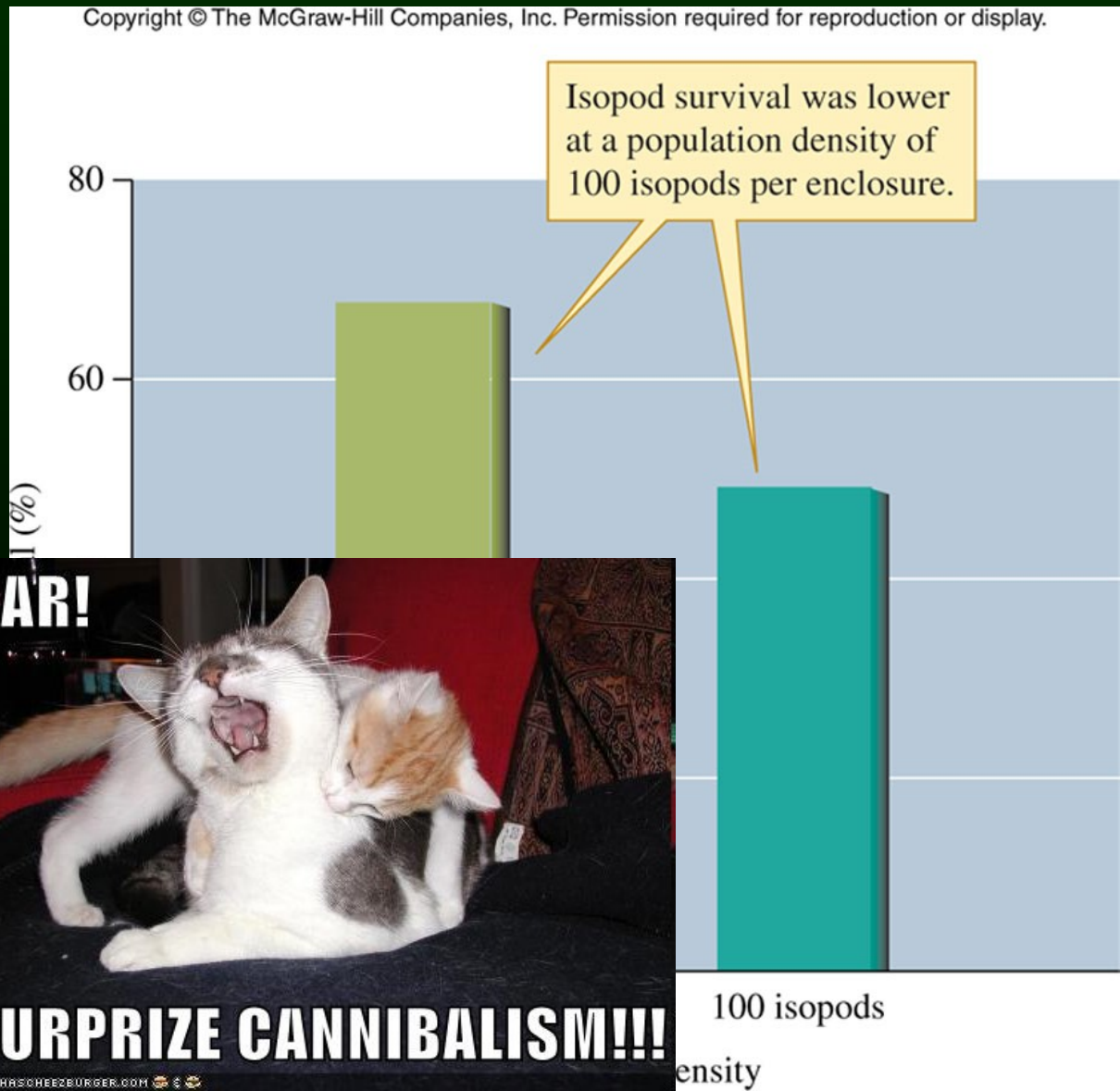
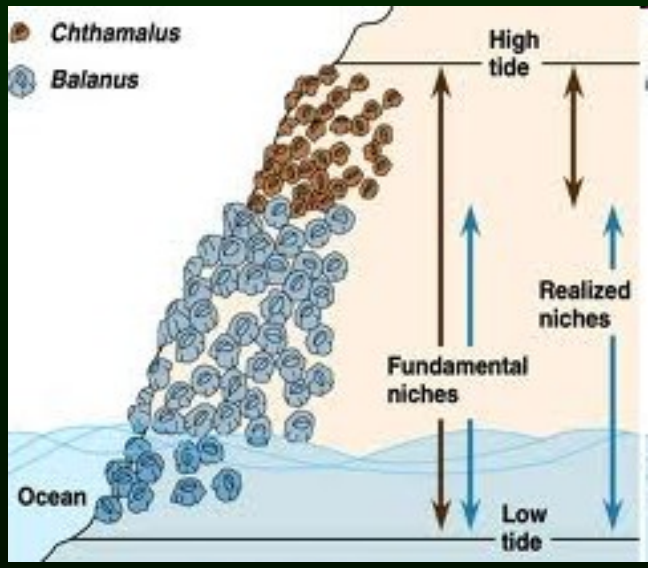


Competitive Exclusion Principle

- Principle of Competitive Exclusion
  - Two species with identical niches cannot coexist indefinitely.



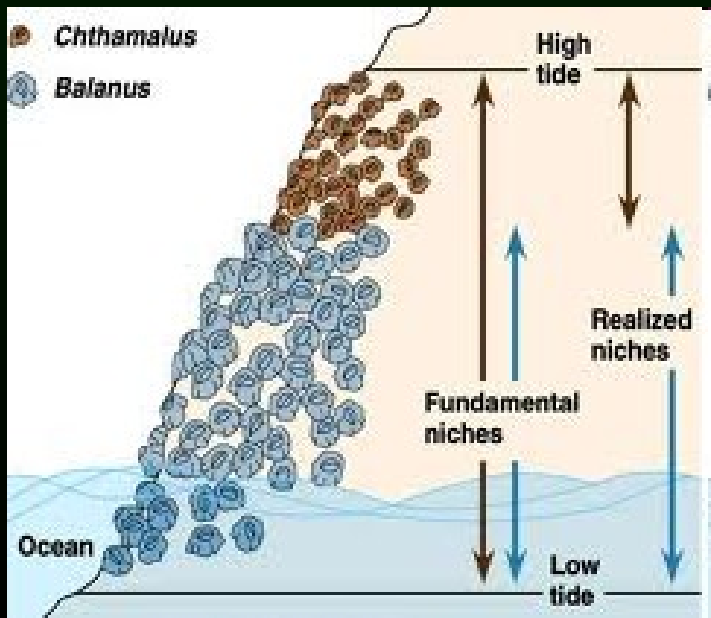
Which is the better competitor?

- One will be a better competitor and thus have higher fitness and eventually exclude the other.

Could Chthamalus ever be the better competitor???

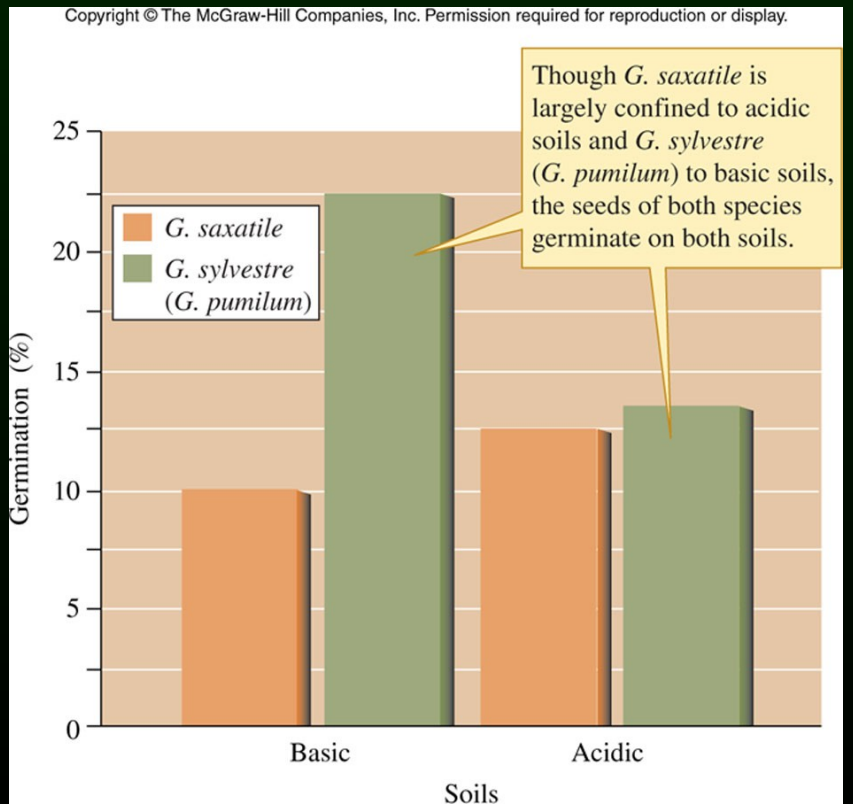
Competition and Niches

- Competition can have significant ecological and evolutionary influences on the niches of species
  - Competition can restrict species to their realized niches.
    - Competition may also produce an evolutionary response in the competitor population.
    - Changes fundamental niche.



Niches and Competition Among Plants

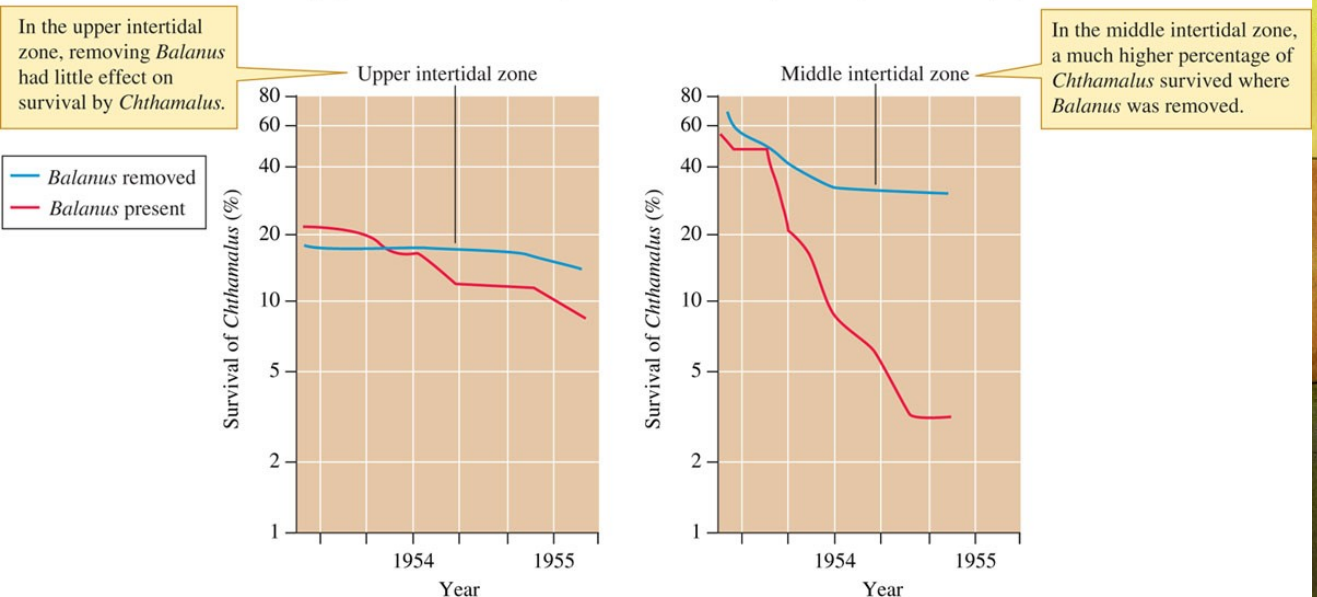
- *T*wo species of bedstraw (*Galium* spp.)
- Which species was a better competitor in basic soils? What about acidic?

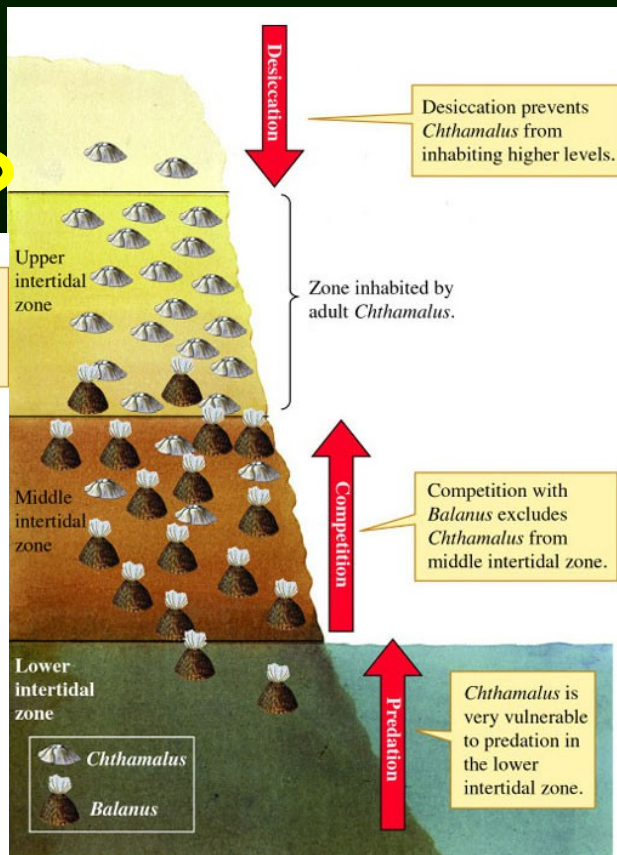


Niche Overlap and Competition Between Barnacles

- *Connell* discovered interspecific competition in barnacles. *Balanus* plays a role in determining lower limit of *Chthamalus* within intertidal zone.

Does this explain everything???





A dilemma!!!

- At the lowest levels in the lower intertidal, Chthamalus suffered high mortality even when Balanus was removed!!!

- Why???

Competition is but one factor!

- Interspec fitness

Does this c
doesn't wan
hyena) help
or lion?

Therefo onary
beneficia

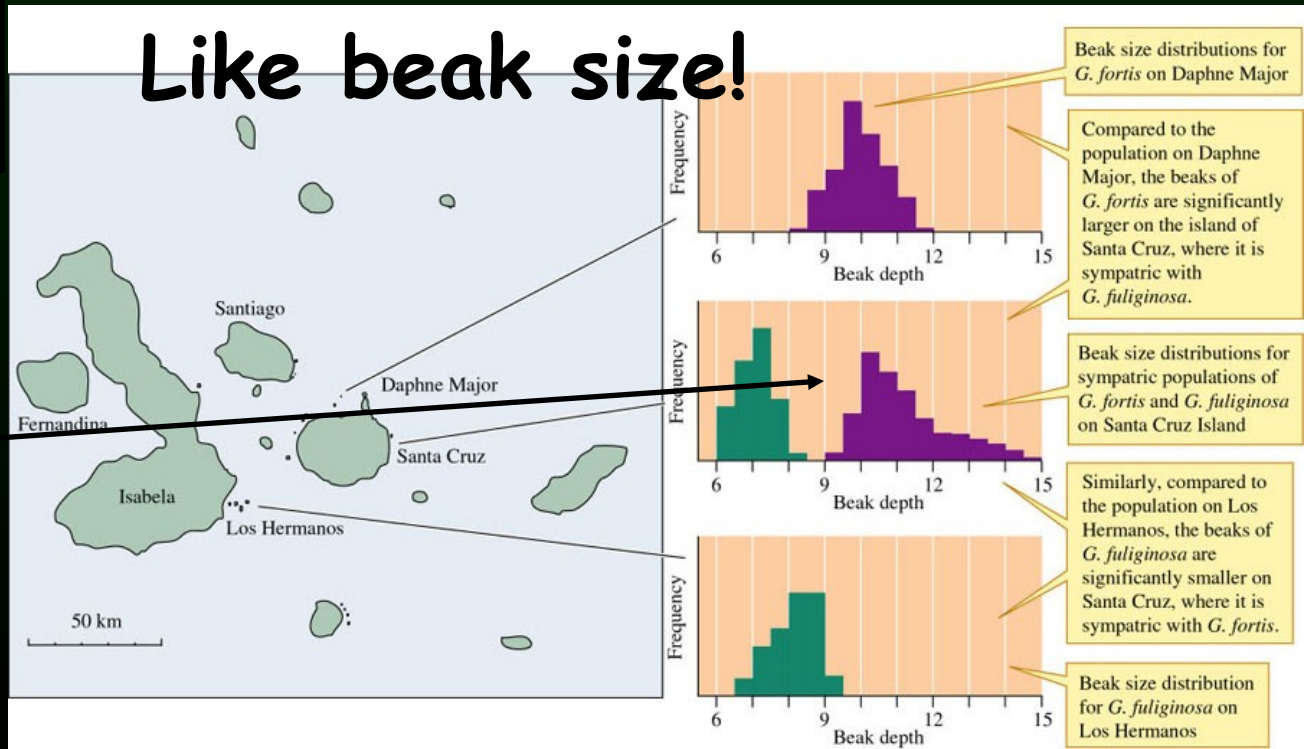
Character displacement can lead to less interspecific competition

Character Displacement

Change in physical characteristic of a population as a result of natural selection – leads to less interspecific competition

Like beak size!

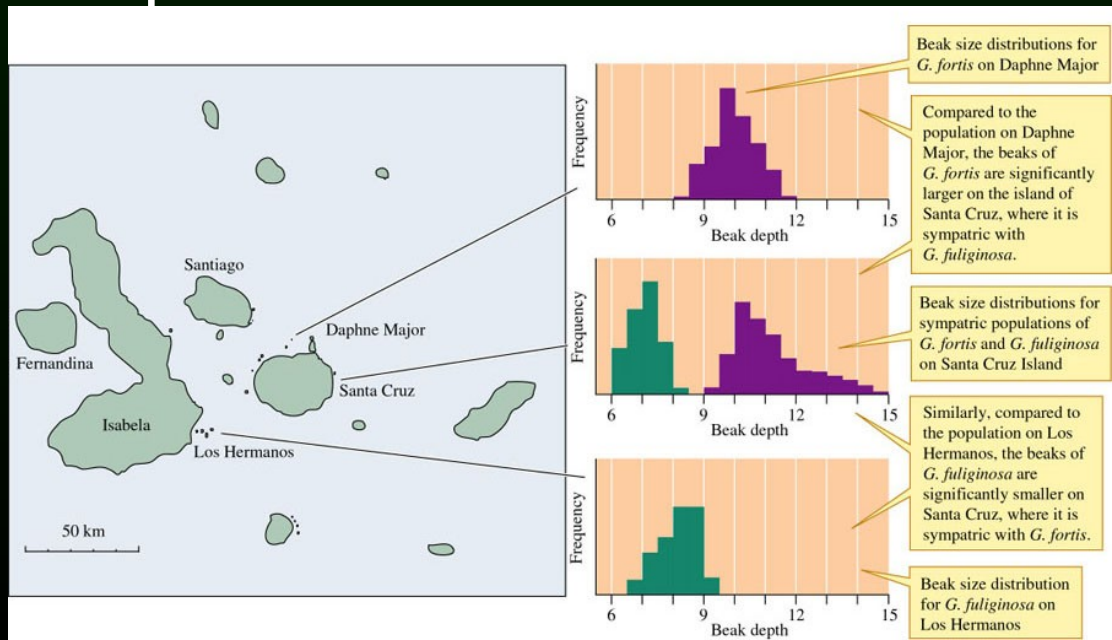
Sympatric – occur in the same area and encounter each other



Character Displacement

- Necessary criteria:
  1. Morphological differences between sympatric species are greater than differences between allopatric (don't occur in same area) populations.
  2. There are genetic differences between sympatric and allopatric populations.
  3. Differences between sympatric and allopatric populations evolved in place

Does the finch example work???

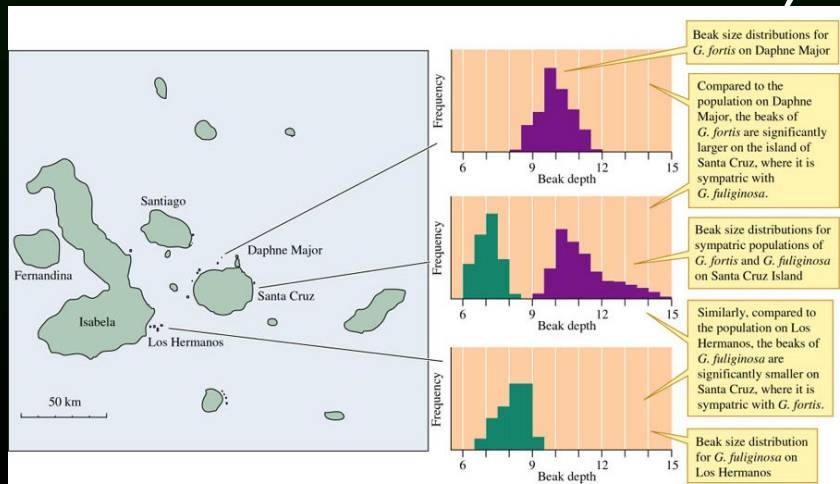


Necessary criteria for character displacement (cont'd)

4. Variation in the character must have an impact on the use of resources
5. Must be demonstrated competition for the resource and competition must be directly correlated with character similarity
6. Differences in character cannot be explained by differences in resources available to each of the populations (i.e. fewer seeds on one island or another)

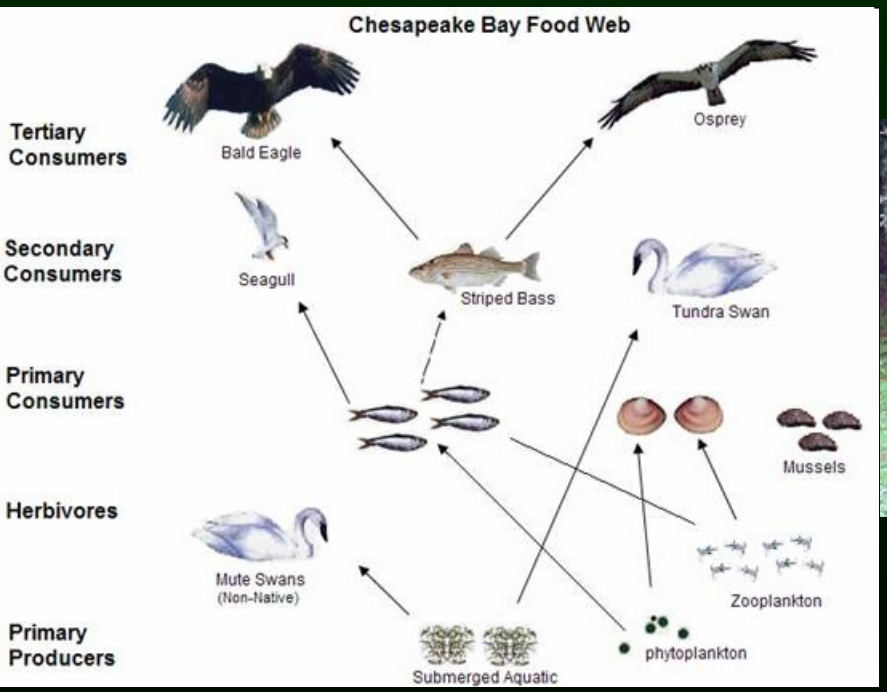
Does the finch example work???

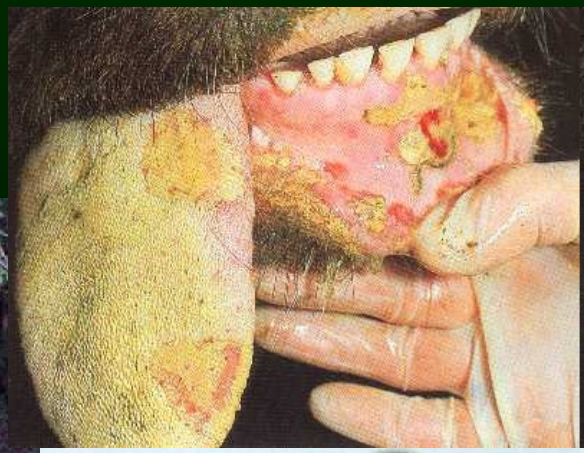
YES!!!



The conclusion!!!

- Competition has a great effect on many populations!





However…competition is but one factor!