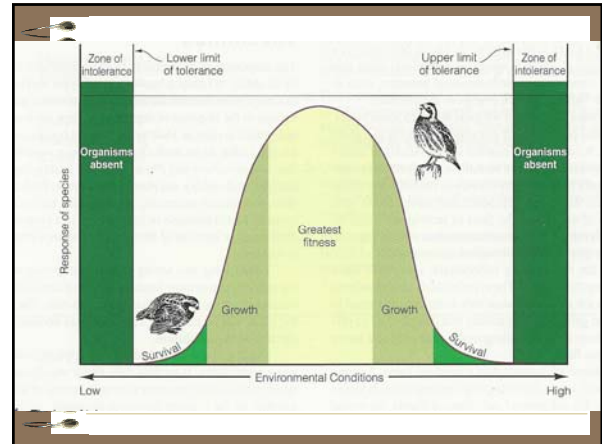


## Hutchinsonian Niche

- List of requirements for resources and conditions. Hypothetical example:
  - Habitat:
    - Tropical grassland, Savannah, and open tropical forest
    - Need Brushland for nest/sleeping sites
  - Food: Ants and termites
    - Medium size
    - Large colonies, (>2000 per nest)
    - More than 2 colonies/hectare
  - Density <2 conspecifics/km<sup>2</sup>
  - Predators <1/100km<sup>2</sup>
  - Low level of human activity

http://www.ams.umn.edu/~antaeater/  
James H. Shaw; Jose Machado-Neto; Tracy S. Carter. 1987. Behavior of Free-Living Giant Anteaters (*Myrmecophaga tridactyla*). *Biotropica*, 19:255-259.



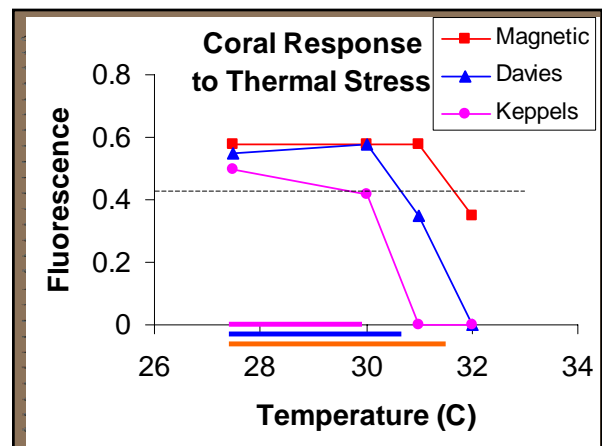
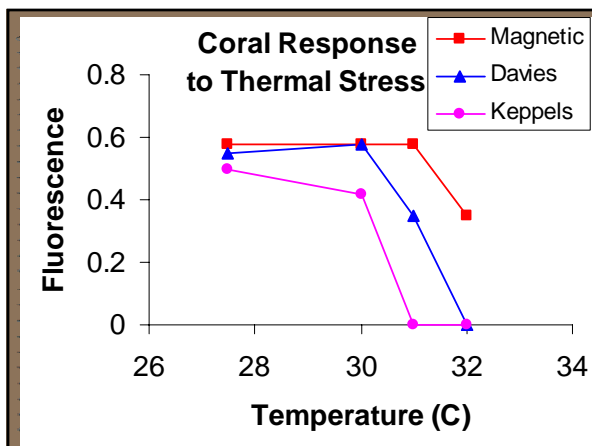
## A different way to think about Eltonian and Hutchinsonian Niches

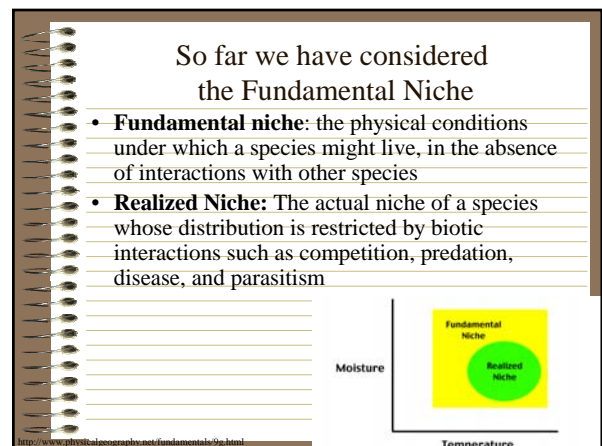
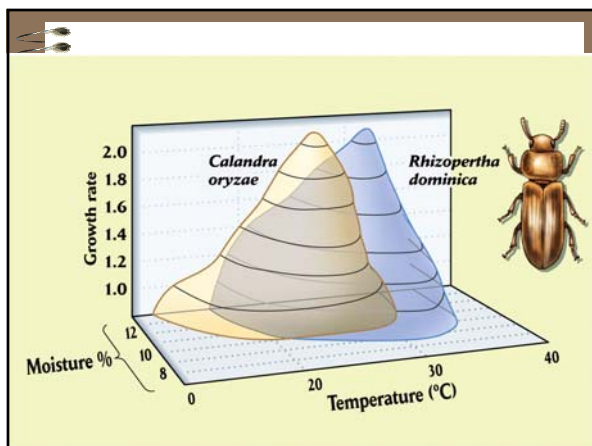
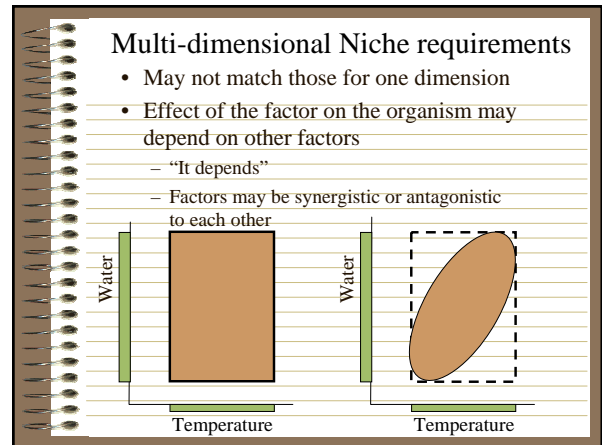
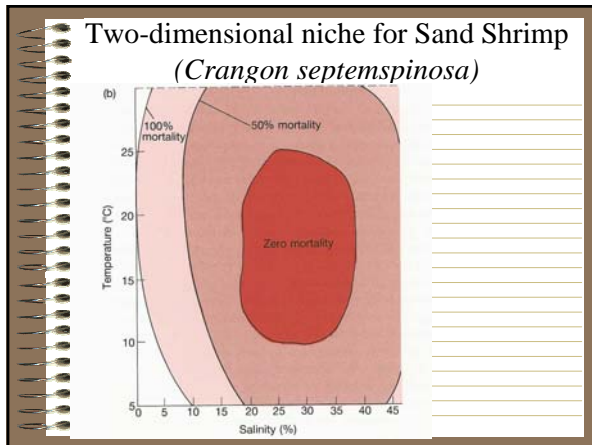
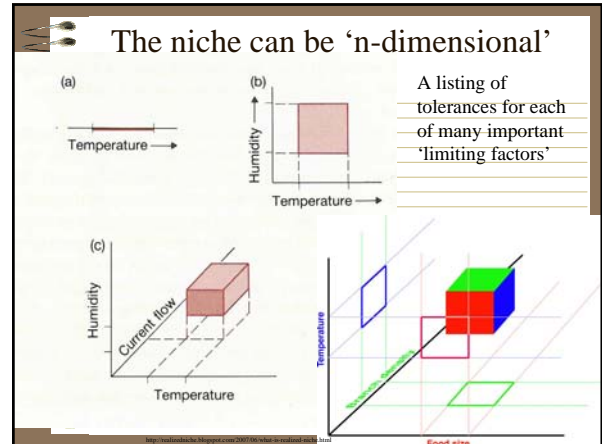
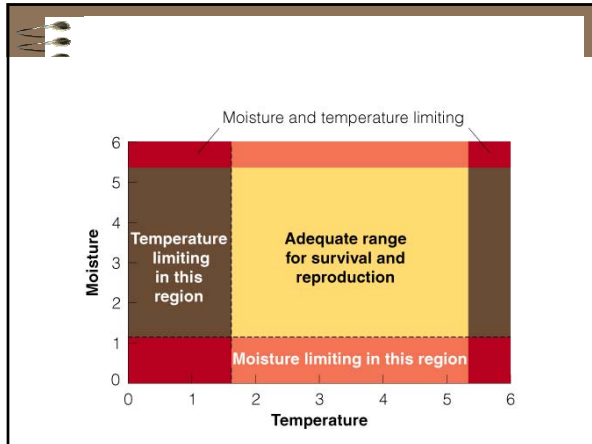
- Eltonian ('job') is the effect of the species on the environment
- Hutchinsonian ('requirements') is the effect of the environment on the species
- Both are important to understand

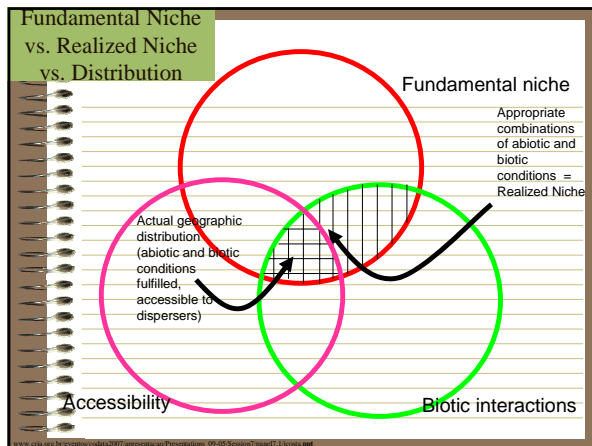
## Do these data inform us about the niche of corals?

- Raised Coral from Australia's great barrier reef in temperature controlled tanks
  - All 12 tanks set to 27.5C for 5 days in 12 different tanks
  - Then heated each tank to a different temperature.
- Measured coral bleaching by fluorescence of the corals; low fluorescence values indicate bleaching.
- Each line and symbol type indicates data from a different site.
- How do these data relate to the idea of the niche?

The four graphs show 'variable fluorescence (Fv/Fm)' on the y-axis (0.0 to 0.8) and 'days from start of heating' on the x-axis (-4 to 15). The temperatures are: control, 30°C, 31°C, and 32°C. Each graph contains multiple lines with different symbols representing different sites. In the control and 30°C tanks, fluorescence remains relatively stable. In the 31°C and 32°C tanks, fluorescence drops significantly over time, indicating bleaching.







- ## Effects of Climate Change on Distribution
- <http://www.nrs.fs.fed.us/atlas/>
  - Evaluate Eastern US habitats on >100 variables
  - Match with distribution and abundance database
    - For Trees: Forest Inventory Atlas (FIA)
    - For Birds: Breeding Bird Survey (BBS)
  - Infer what factors limit distribution
  - Then predict suitable habitats under 2x CO<sub>2</sub> (~5C warmer)
    - 5 different Climate Models “General Circulation Models”: SGCM

- ## Climate Change Atlas
- Which sort of niche did the examples in the climate change atlas consider?
    - A) Realized Hutchinsonian Niche
    - B) Fundamental Hutchinsonian Niche
    - C) Realized Eltonian Niche
    - D) Fundamental Eltonian Niche