

Community ecology

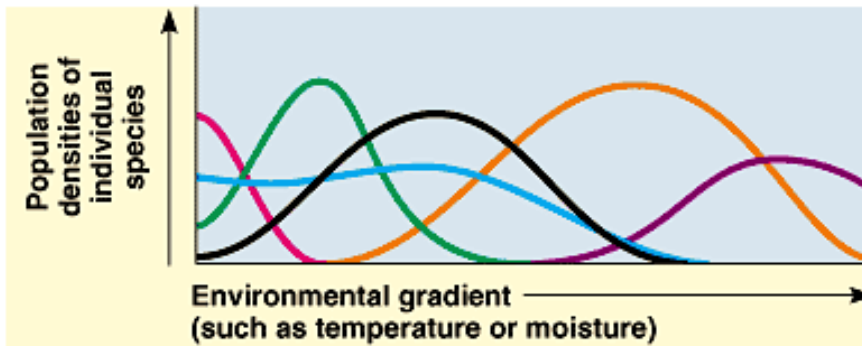
Community Ecology

- Definition: assemblage of species that occur together at the same place
- Goals: 1) understand the factors that determine the number of species that can coexist in one place and how this number varies from place to place; 2) understand how species interactions influence the structure and dynamics of communities
- Importance: 1) help us understand diversity organization in nature; 2) species interactions within communities affect flow of energy and nutrient cycling in ecosystems and 3) influence population level processes

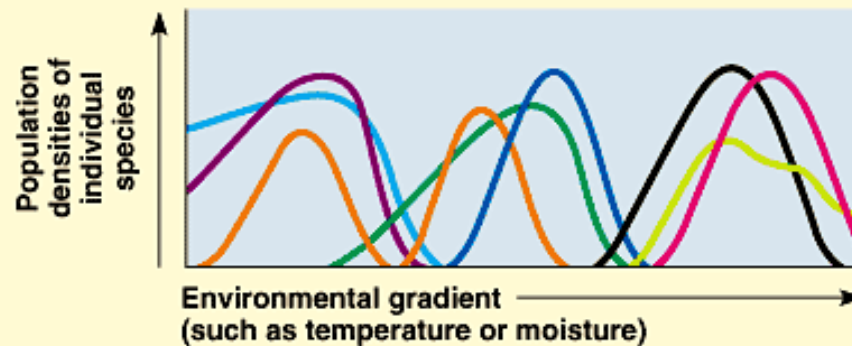
Community concepts

- Holistic: views communities as organized ecological units in which the functions of various species are connected like those of parts of the body and have evolved so as to enhance their interdependent functioning (F. A. Clements)
- Individualistic: views communities merely as fortuitous associations of species whose adaptations and requirements enable them to live together under the particular physical and biological conditions of a given place (H. A. Gleason)

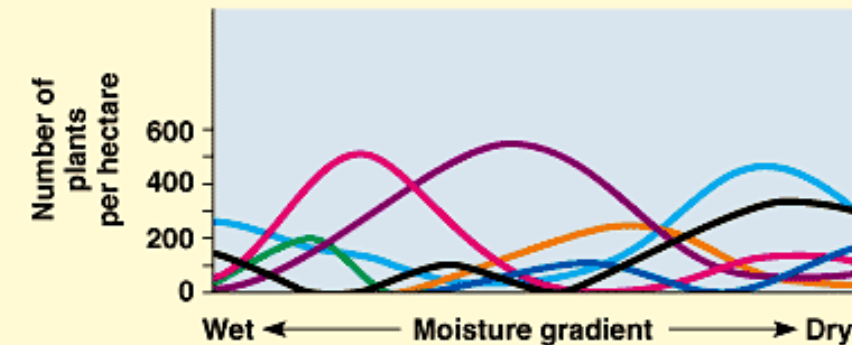
Testing the individualistic and holistic (interactive) hypotheses of communities



(a) Individualistic hypothesis



(b) Interactive hypothesis



(c) Trees in the Santa Catalina Mountains

Processes behind community structure

- Biotic factors
 - Competition, predation, herbivory, parasitism, mutualism
- Abiotic factors
 - Weather related factors

Community structure

- Species richness/diversity
- Food webs
- Trophic guilds
- Relative abundance
- Dominant species
- Keystone species
- Trophic cascades
- Disturbance

Food webs

- Emphasizes the connections between populations belonging to different feeding (trophic) positions while recognizing the importance of diversity (e.g. not all herbivores consume all producers)
 - Trophic level: feeding position of species within a community: consumers, herbivores, carnivores

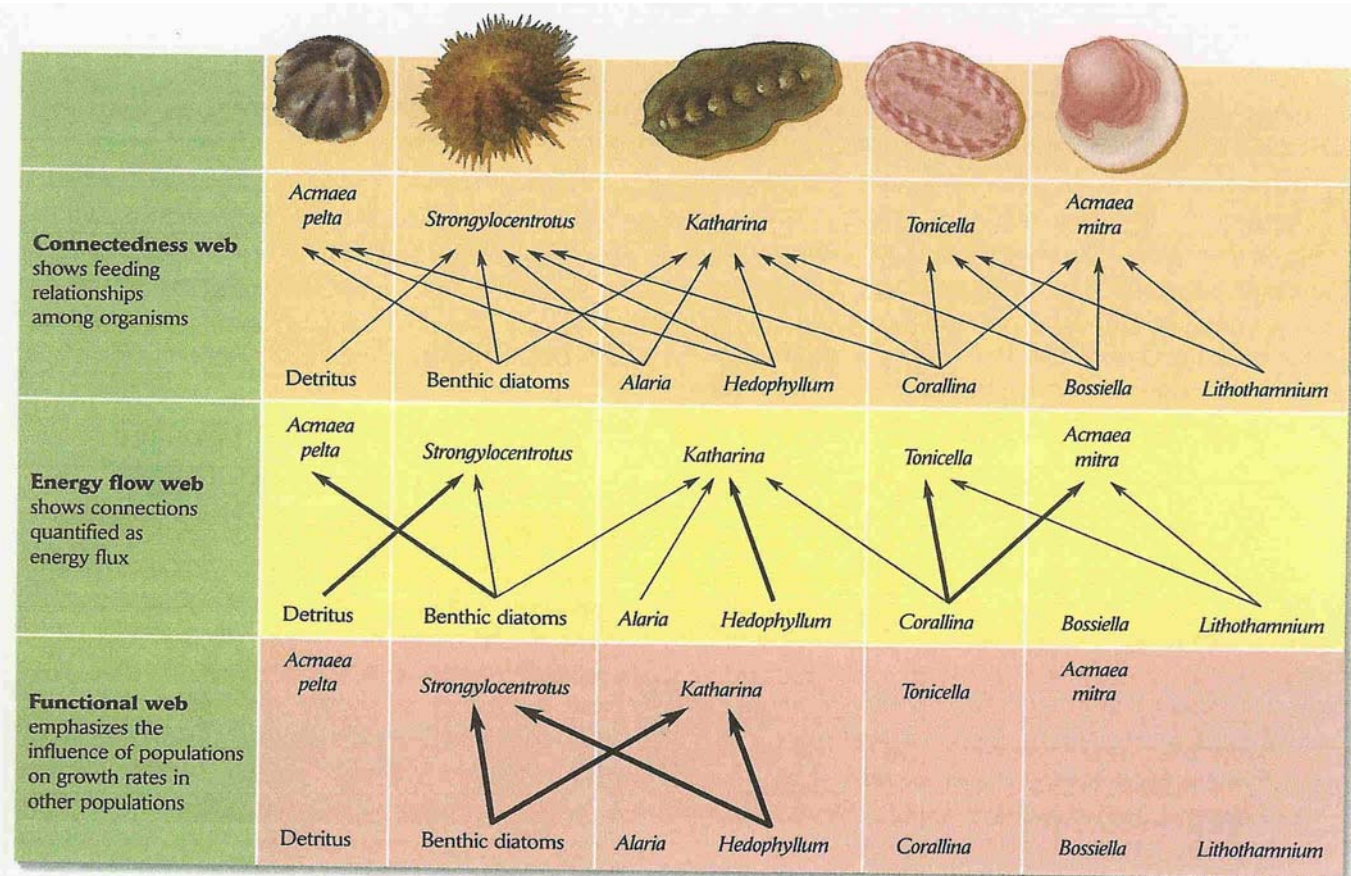
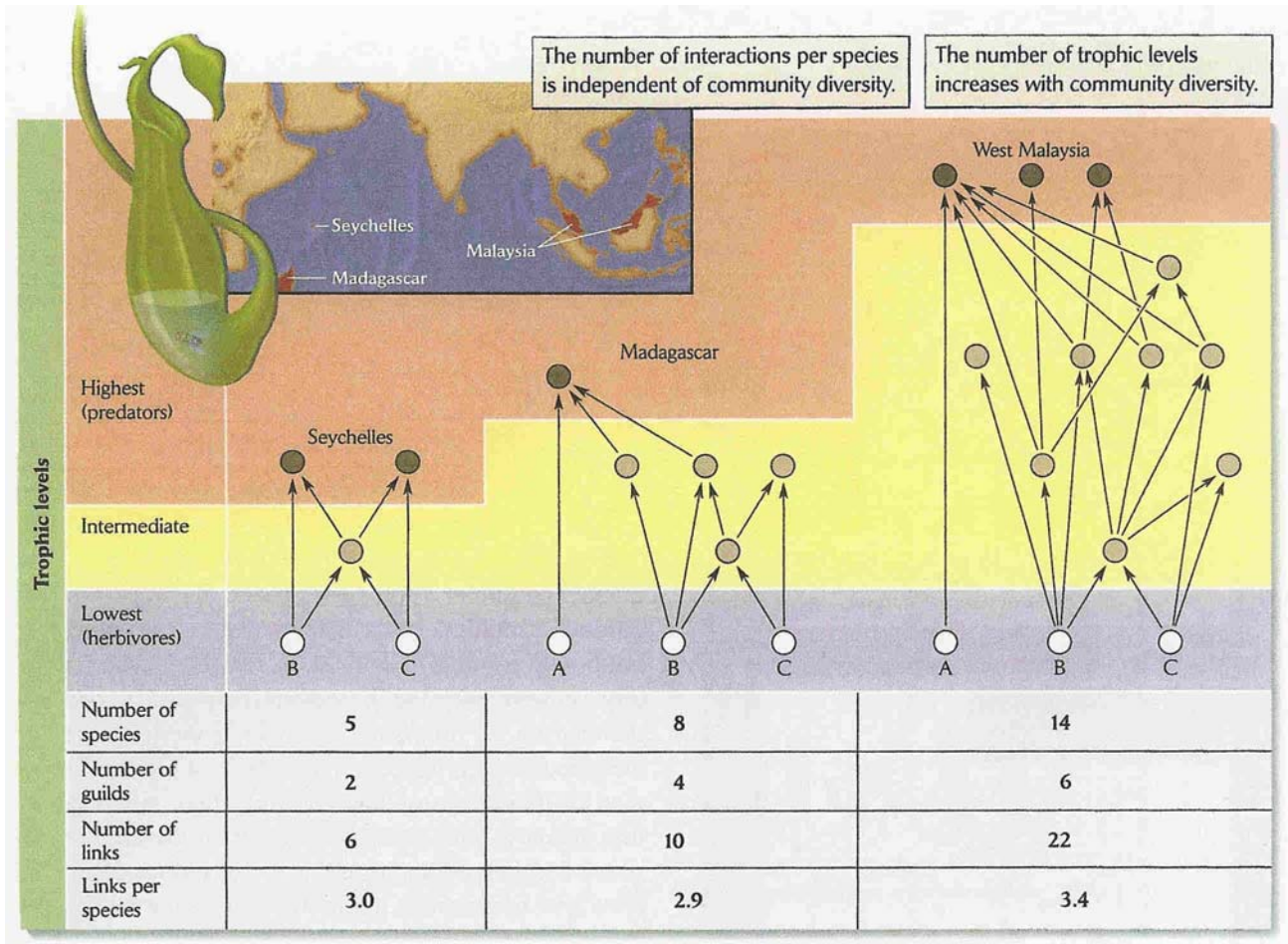


Figure 21.12 Ecological webs: Connectedness, energy flow, and functional



Dominant species

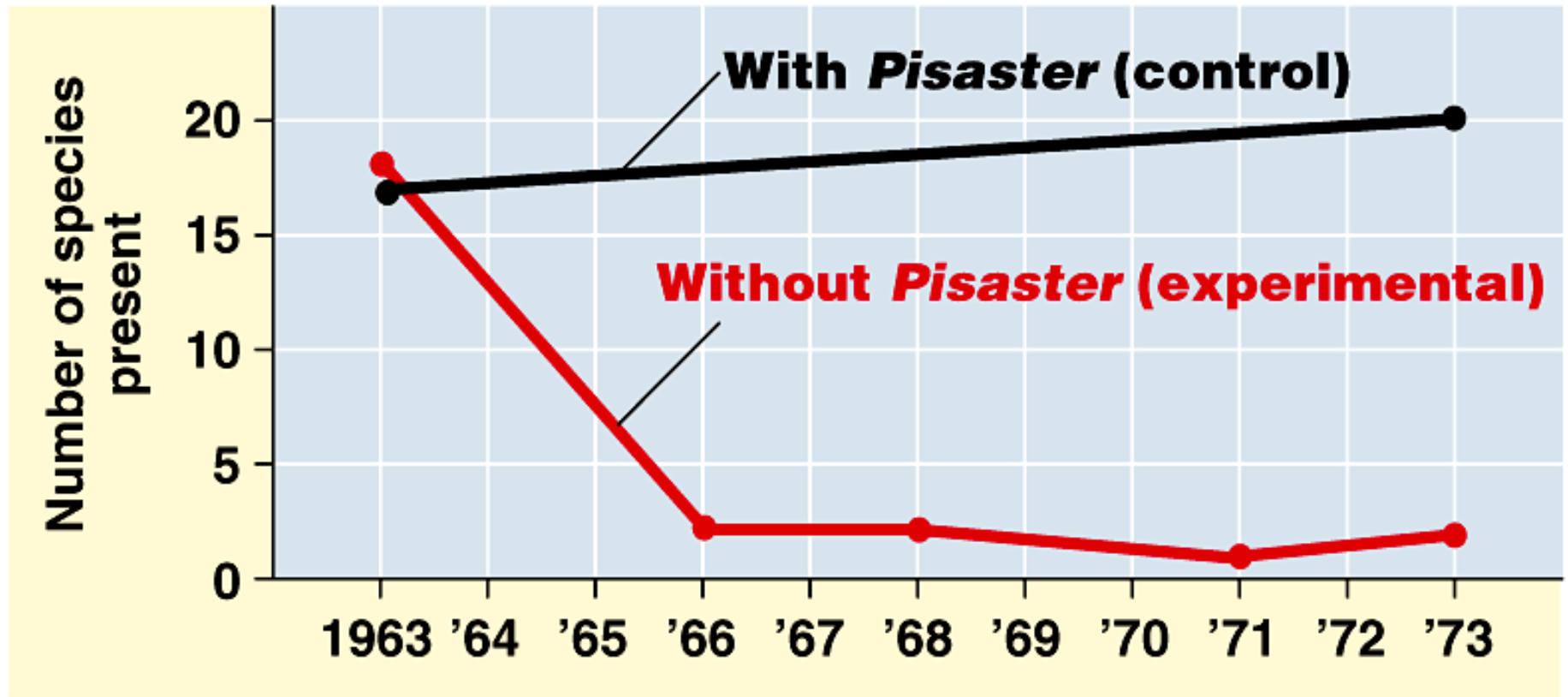
- In a community, most species are rare and only a few are highly abundant.
- A dominant species is that with the highest abundance or biomass (the sum weight of all individuals in the population); it can control the occurrence and distribution of other species
 - How: it is a better competitor for resources or it is better at avoiding predation

Keystone species

- Keystone species are not specially abundant in the community but they exert strong control on community structure through their ecological roles

Testing a keystone predator hypothesis





(b)

Sea otters as keystone predators in the North Pacific

