What’s a community?
- Individuals? Populations?
- **Interspecific** interactions are key
- Has structure determined by….

### Common interactions between species

<table>
<thead>
<tr>
<th>Interaction</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Competition (−/−)</td>
<td></td>
</tr>
<tr>
<td>Predation (+/−)</td>
<td>(includes parasitism)</td>
</tr>
<tr>
<td>Mutualism (+/+</td>
<td></td>
</tr>
<tr>
<td>Commensalism (+/0)</td>
<td></td>
</tr>
</tbody>
</table>

Fig. 54.9

### Competition

- Only occurs when…

**Gause**’s experiment

- **Paramecium**
  - Separately
  - In mixed population

- **P. caudatum**
  - Separately
  - In mixed population

---

### Resource partitioning

- Besides C.E., a species can evolve to use different resources

[Dominican Republic]

---

**Dominican Republic**

**A. distichus** perches on fence posts and other sunny surfaces.

**A. caninorum** perches on shady branches.

**A. angoffi**

**A. ristant**

**A. chrysostoma**

**A. cythera**

---

**Connell’s experiment**

- **Balanus**
  - High tide
  - Chthamosus realized niche

- **Chthamosus**
  - Low tide
  - Balanus realized niche

---

**Connell’s experiment**

- What’s the limiting resource?

- **Niches**
  - Fundamental
  - Realized

Fig. 54.3
Mutualism

Beltian bodies

(a) Hollow thorns that house stinging ants of the genus Pseudomyrmex
(b) Area cleared by ants around an acacia tree

Fig. 54.8

Predation and evolution

(a) Mechanical defense
   - Porcupine
(b) Chemical defense
   - Skunk
(c) Aposematic coloration: warning coloration
   - Poison dart frog
(d) Cryptic coloration: camouflage
   - Canyon tree frog
(e) Batesian mimicry: A harmless species mimics a harmful one
   - A venomous green parrot mimics a poisonous hawkmoth larva
(f) Müllerian mimicry: Two unpalatable species mimic each other
   - A yellow jacket
   - A cuckoo bee

Fig. 54.5

Communities and feeding

- Trophic structure: feeding relationships between organisms

Trophic levels?

Herbivore

Primary consumers

Secondary consumers

Tertiary consumers

Carnivore

Quaternary consumers

A terrestrial food chain

A marine food chain

Are food chains the whole story?

Fig. 54.14

A more complete story

- Antarctic marine food web

Fig. 54.15

Does the identity of the species in a food web matter?

- Keystone species have an impact greater than their numbers suggest

Fig. 54.18

Communities over time

- Stable equilibrium or non-equilibrium?
  - The impacts of disturbance

(a) Soon after fire
(b) One year after fire

Fig. 54.21
Ecological succession

- Primary vs. secondary succession... examples?

![Ecological succession diagram](image)

Describing species diversity

- Species richness and evenness
- Which community is more diverse?

![Species diversity diagram](image)

Biodiversity vs. area

- Species-area curve; why?

![Biodiversity vs. area graph](image)

Island biogeography theory (1)

- Two important underlying processes according to MacArthur and Wilson (1967)

![Island biogeography theory graph](image)

Island biogeography (2)

- Adding area back in the equation

![Island biogeography graph](image)