Relationships and Interactions

- Chapter 5.2

RELATIONSHIPS & INTERACTIONS

- Mutualism
- Commensalism
- Predation
- Parasitism
- Competition

Table 4.1 → Effects of Species Interactions on Their Participants

Type of Interaction	Effect on species 1	Effect on species 2
Mutualism		
Commensalism		
Predation		
Parasitism		
Competition		

MUTUALISM

- Help one another → "mutual" relationship
- 2 or more species benefit from interactions with one another
- Each partner provides some resource or service that the other needs

Type of Interaction	Effect on species 1	Effect on species 2
Mutualism	+	+

Mutualism

1.

2.

3.

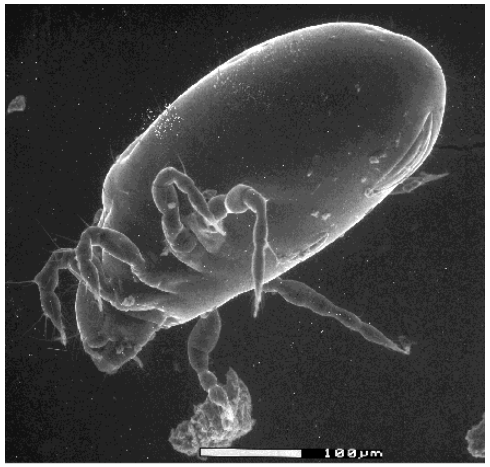
COMMENSALISM

- One benefits and the other is unaffected
- For example, a plant creates conditions that happen to make it easier for another plant to establish and grow (yet it has no influence, neither positive nor negative, for itself

Type of Interaction	Effect on species 1	Effect on species 2
Commensalism	+	0

Commensalism

1.



2.

PREDATION

- One benefits and the other is harmed
- The *predator*—hunts, captures, kills, and consumes an individual of another species, the *prey*

Type of Interaction	Effect on species 1	Effect on species 2
Predation	+	–

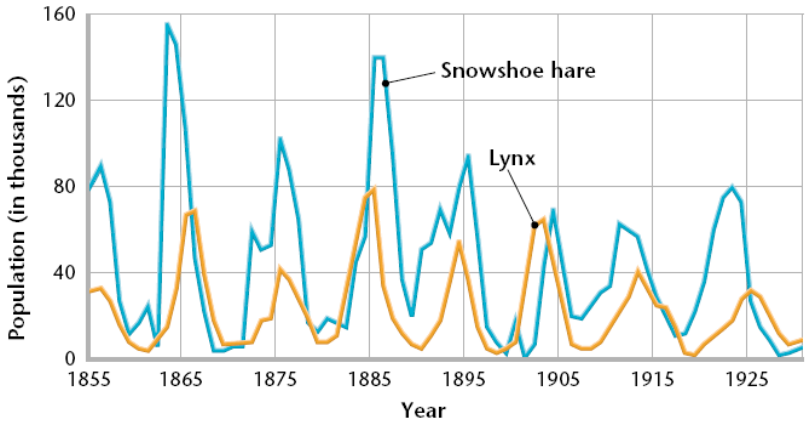
Predation

1. 

2. 

Predation

- Causes cycles in predatory and prey population sizes



- Predation drives adaptations in prey

Predation drives adaptations in prey

(a) Cryptic coloration

(b) Warning coloration

(c) Mimicry

Cryptic coloration:
Camouflage to hide from predators

Warning coloration:
Bright colors warn that prey is toxic

Mimicry:
Fool predators (here, caterpillar mimics snake)

Predation

- Some predator-prey relationships are examples of **coevolution**
- Coevolution = process by which two species evolve in response to changes in each other

Rough-Skinned Newt

Did You Know? *A single rough-skinned newt contains enough poison to kill 100 people. Unfortunately for the newt, its predator, the common garter snake, has coevolved resistance to the toxin.*

PARASITISM

- One organism, the *parasite*, depends on another, the *host*, for nourishment or some other benefit while simultaneously doing the host harm
- Parasite exploits another organism without killing it

- (herbivory = act of animal feeding on a plant)

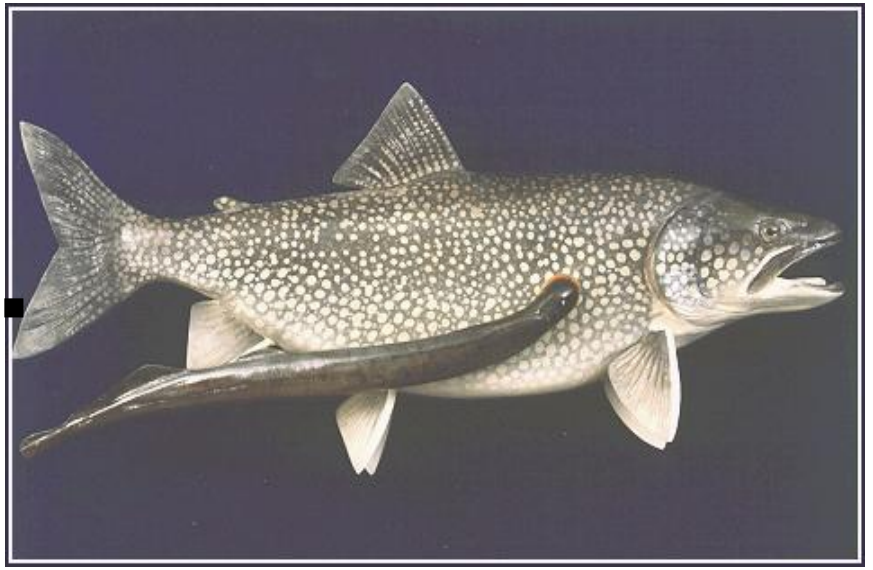
Type of Interaction	Effect on species 1	Effect on species 2
Parasitism	+	-

External Parasites

1. 

3. 

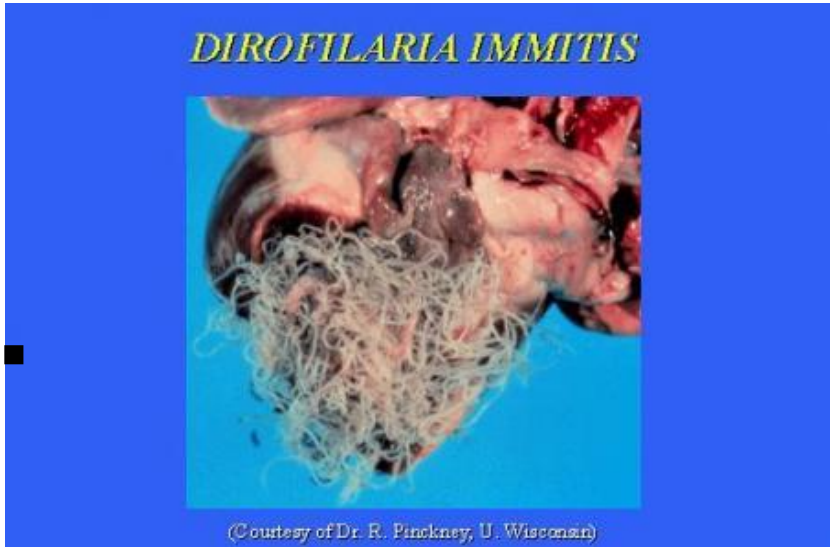
2. 

4. 

Internal Parasites

1.

2.



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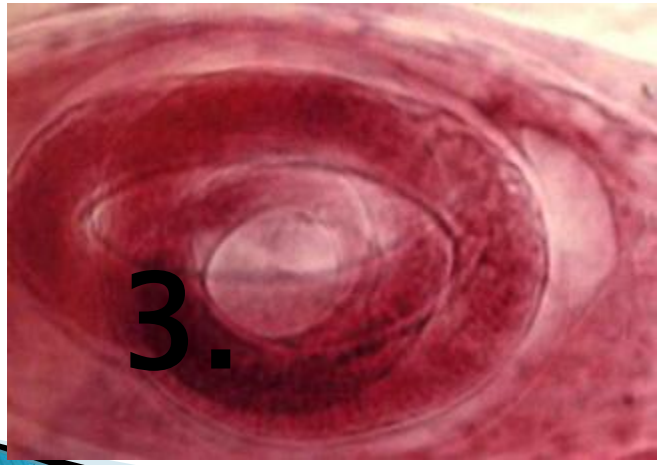


COMPETITION

- Multiple organisms seek the same limited resource
- The fitness of one organism is lowered by the presence of another
- Usually does NOT involve active fighting, but subtle matches to acquire resources
- Organisms compete for :
  - Food, water, territory, shelter, mates, etc.
- Interactions can take place…
  - between members of the **same** species →
  - Between members of two or more **different** species →

Type of Interaction	Effect on species 1	Effect on species 2
Competition	+	–

Arising Problems in IntErspecific..

- Affects the composition of the community
- Gives rise to different outcomes: if one species is a very effective competitor, it may exclude another species from resources entirely →
- If neither competitor fully excludes the other, the species may continue to live side by side →
  - When using the same resources, species will adjust to their competitors to minimize competition

Interspecific competition

- Adjusting resource use, habitat use, or way of life over evolutionary time leads to:

- resource partitioning = species specialize in different ways of exploiting a resource
  - Tree-climbing bird species exploit insect resources in different ways

- Character displacement = physical characters evolve to become different to better differentiate resource use

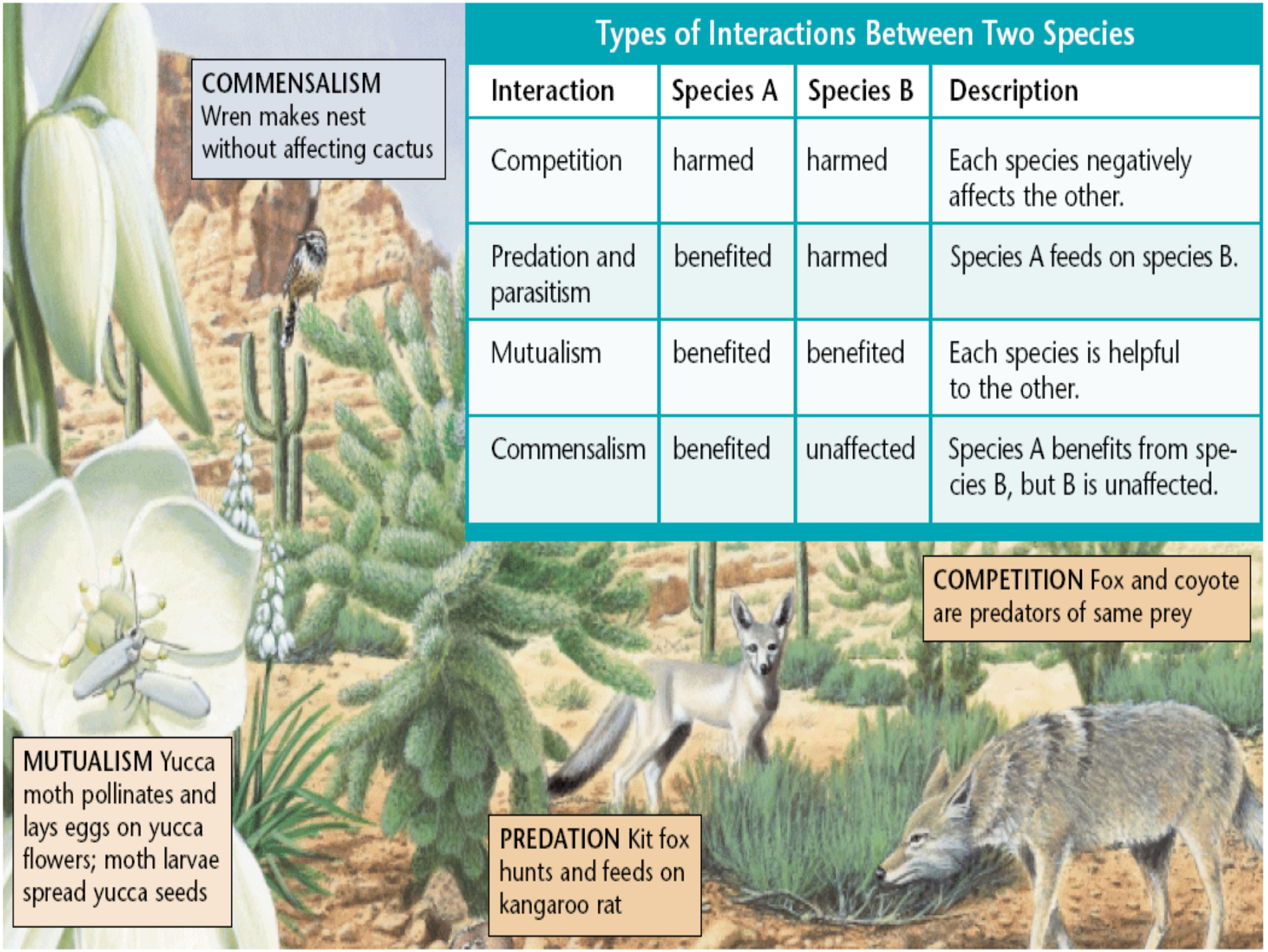
Competition

1

2.

3.

Type of Interaction	Effect on species 1	Effect on species 2
Mutualism	+	+
Commensalism	+	0
Predation	+	–
Parasitism	+	–
Competition	+	–



Types of Interactions Between Two Species

Interaction	Species A	Species B	Description
Competition	harmed	harmed	Each species negatively affects the other.
Predation and parasitism	benefited	harmed	Species A feeds on species B.
Mutualism	benefited	benefited	Each species is helpful to the other.
Commensalism	benefited	unaffected	Species A benefits from species B, but B is unaffected.

Symbiosis

- Long-term and physically close relationship between two organisms from different species in which *at least one* organism benefits

- **What are examples of symbiotic relationships?**

  Mutualism,

  Commensalism,

  Parasitism

Adaptations

- Used for obtaining food, protection, and locomotion
- Define behavioral adaptation, structural adaptation
- Find at least FIVE examples of protective adaptations
- With each adaptation, include a specific animal example

Physical adaptation

Camouflage (use of color in a surrounding)

The chameleon can change its color to match its surroundings.

Physical adaptation

Mimicry

(looking or sounding like another living organism)

The Viceroy butterfly uses mimicry to look like the Monarch butterfly. Can you tell them apart?

Poisonous

I'm the Monarch!

I'm the Viceroy!

Not poisonous

Physical adaptation

Chemical defenses (like venom, ink, sprays)

Physical adaptations

Body coverings & parts (claws, beaks, feet, armor plates, skulls, teeth)

The elephant's TRUNK is a physical adaptation that helps it to clean itself, eat, drink, and to pick things up.

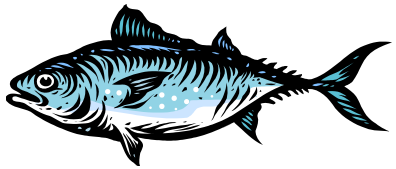
Now let's learn about

Behavioral Adaptations...

Behavioral Adaptations allow animals to respond to life needs.

We can divide **Behavioral Adaptations** into two groups:

Instinctive



These behaviors happen naturally & don't have to be learned.

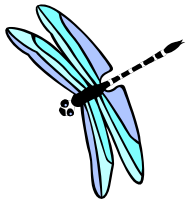
Learned

These behaviors must be taught.

Instinctive behaviors

=

happen naturally & don't need to be learned



Methods of gathering & storing food

Defending oneself

Hibernating

Finding shelter

Raising young

Migrating

Learned behaviors

=

Obtained by interacting with the environment and cannot be passed on to the next generation except by teaching

Cougars teach cubs how to hunt

Teaching a dog to roll over

Cows teach their calves what grasses are best to graze and where

End of unit activity:

- Squirrel Population Worksheet