

Patterns of Evolution

Chapter 17

Section 4

Species adapt to their environment in several ways.

The speed and pattern of evolution depend on the changes occurring in the environment.

The 3 main patterns of evolution are:

- Coevolution
- Convergent evolution
- Divergent evolution



Coevolution



- Coevolution is the process of change in 2 or more species that are dependent on each other.
- An evolutionary change in one organism may also be followed by a change in another organism.
- Examples:
 - Birds and flowers
 - Bees and flowers



Coevolution Example

- Hummingbirds and the flowers they pollinate.
 - The longer the beak of the hummingbird, the more food it will get.
 - The farther away the food in the flower, the better the flower gets pollinated.



Convergent Evolution

- What does Convergent mean?
 - to bring together
- Convergent evolution is when organisms with different ancestry have similar phenotypes
- This occurs because of the environment the organisms live in causes similar characteristics to be fit, therefore leading to similar characteristics being passed on.
- Structures are usually analogous to one another

Convergent Evolution Examples

- Sharks and dolphins
 - Sharks are fish, while dolphins are mammals.
 - However, both sharks and dolphins are similar in their body structures: fins, smooth body, etc.



Divergent Evolution

- What does divergent mean?
 - To move apart
- Divergent Evolution occurs when organisms that are similar become different.
- Usually caused by different habitats
- Can result in new species formation

Examples

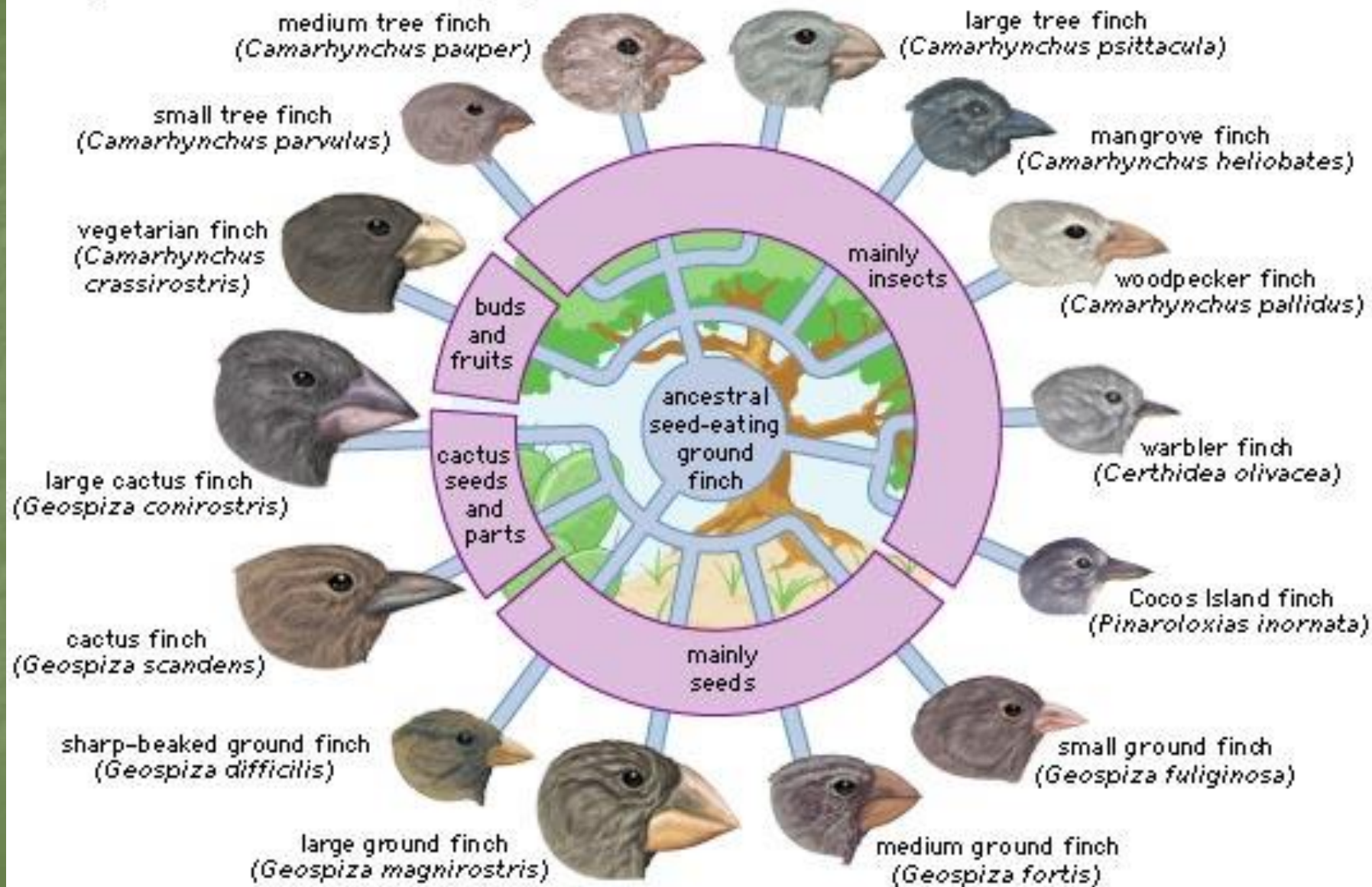
- Polar bears and brown bears
 - Polar bears and brown bears have common ancestors
 - The differing environments selected different fitness characteristics



Adaptive Radiation is a type of divergent evolution

- Adaptive radiation occurs when a number of different species evolve from a single common ancestor.
- Ex: Galapagos Finches – Each evolved from the same mainland species, but because the islands had different food, their beaks shapes changed over time.

Adaptive radiation in Galapagos finches



Artificial Selection

- Artificial Selection is the breeding of organisms for certain traits. It is a type of divergent evolution, but sped up.
- In artificial selection, nature provided the variation, and humans selected those variations that they found useful.



Ex: Peas

Peas have 2 variations yellow and green (recessive). All peas we eat are green because farmers bred the green peas to produce a pure strain.

Artificial Selection cont'd

- Ex: Domesticated dogs
 - All dogs are the same species *Canis familiaris* but they have been bred by humans for certain characteristics.



~10,000 years of evolution by artificial selection