SPECIATION

Prof.Nuzhat Jahan
Department Of Zoology
Karim City College.

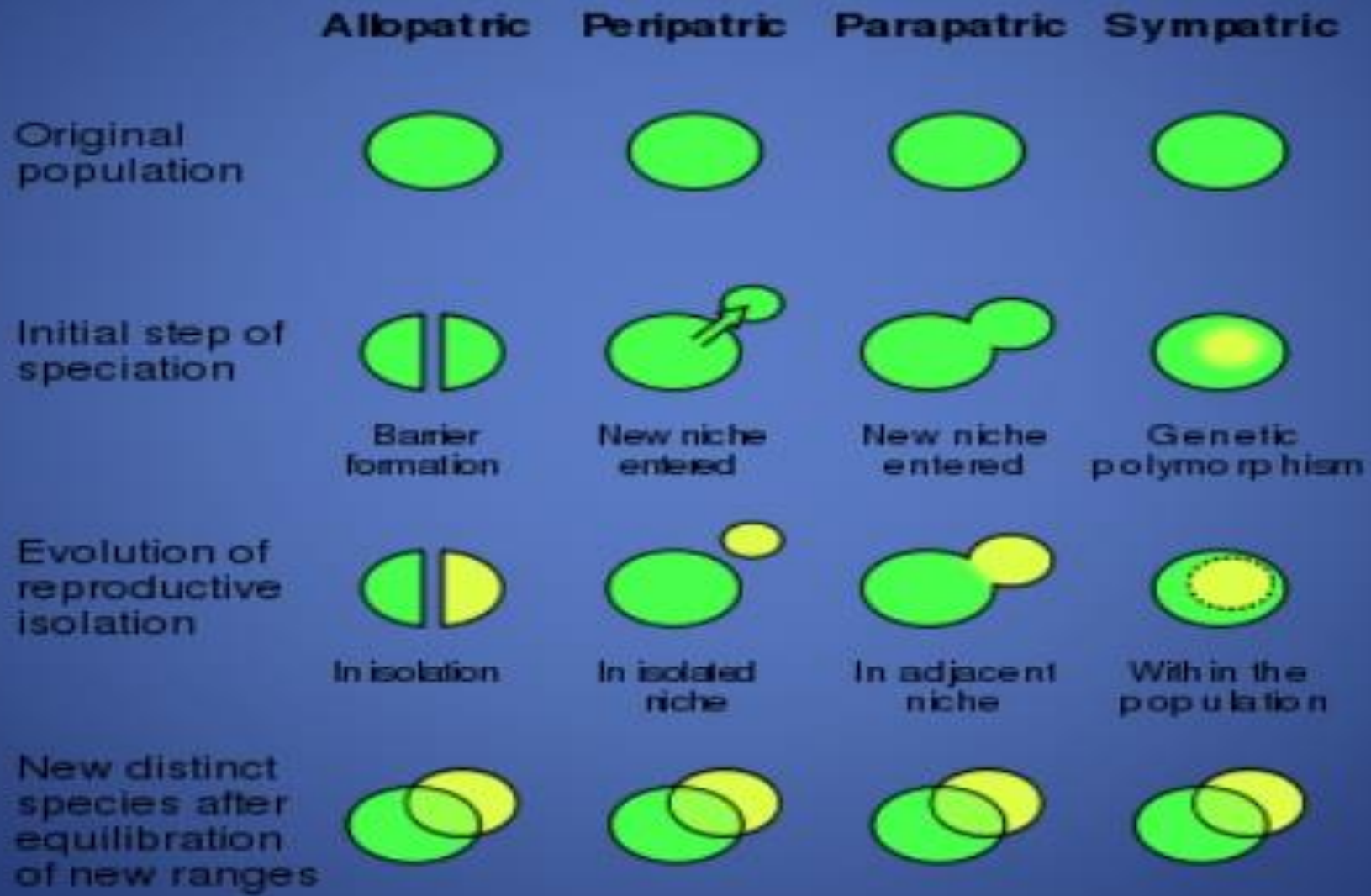
Speciation

- Development of a new species through a variety of factors
- Rate of speciation depends on generation time, environmental conditions, etc.
- Can be caused by a change in just 1 gene or a set of genes causing some sort of isolation

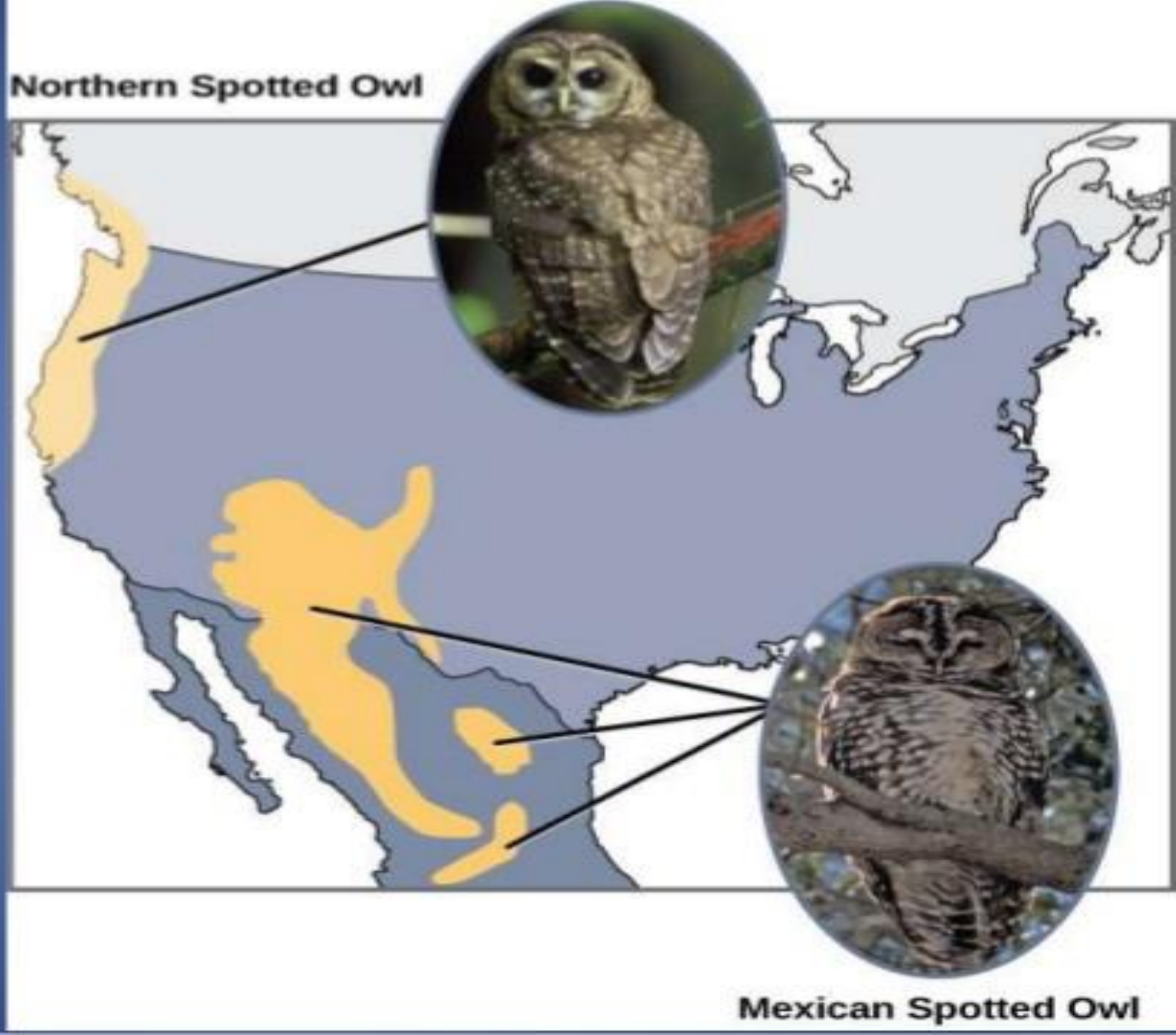
Types of Speciation

- **Allopatric Speciation**—gene flow is interrupted when a population is divided into geographically isolated subpopulations
- **Parapatric Speciation**—occurs when part of a population enters a new habitat bordering the range of the parent species
  - Some gene flow may occur between populations in border zone
- **Sympatric Speciation**—occurs in populations that live in the same geographic area
  - Less common than allopatric speciation
  - Happens when gene flow is diminished by:
    - Polyploidy
    - Habitat differentiation
    - Sexual selection

Types of Speciation



Allopatric Speciation



Parapatric Speciation

Ephedra californica

Ephedra trifurca

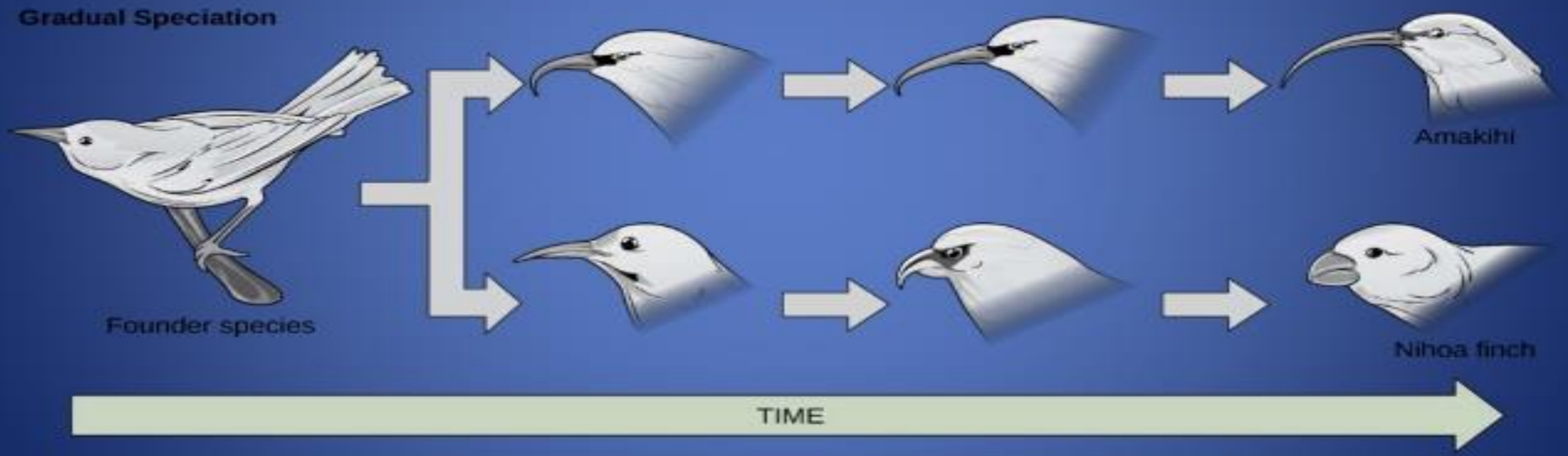
Sympatric Speciation

Apple maggot flies (Rhagoletis pomonella) on domestic apple (left) and on much smaller native hawthorn fruits (right). Flies that emerge from a given host generally return to mate and lay eggs on the same type of fruit.

How Does Speciation Occur?

- **Gradualism**—one species gradually transforming into another through a series of intermediate forms
  - Evolutions occurs in small, incremental changes over MANY generations
  - Should be able to see in fossil record but we do not – intermediate forms NOT present in fossils
    - Fossil record incomplete or;
    - Missing links too rare in fossils or;
    - See next slide ☺

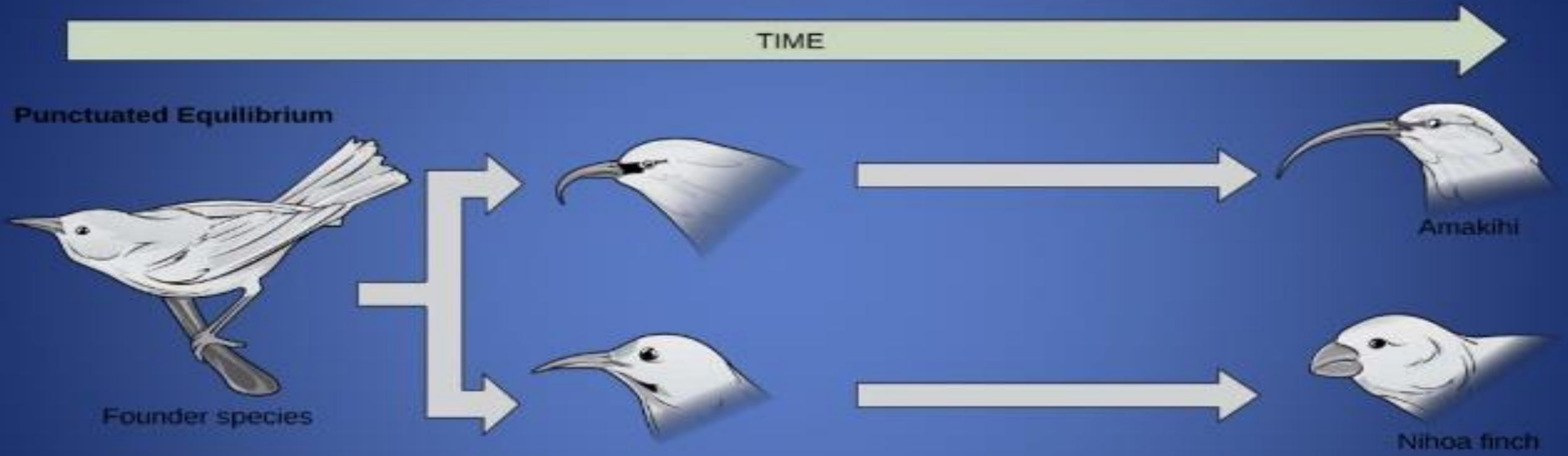
Gradualism


Gradual Speciation
Amakihi
Founder species
Nihoa finch
TIME

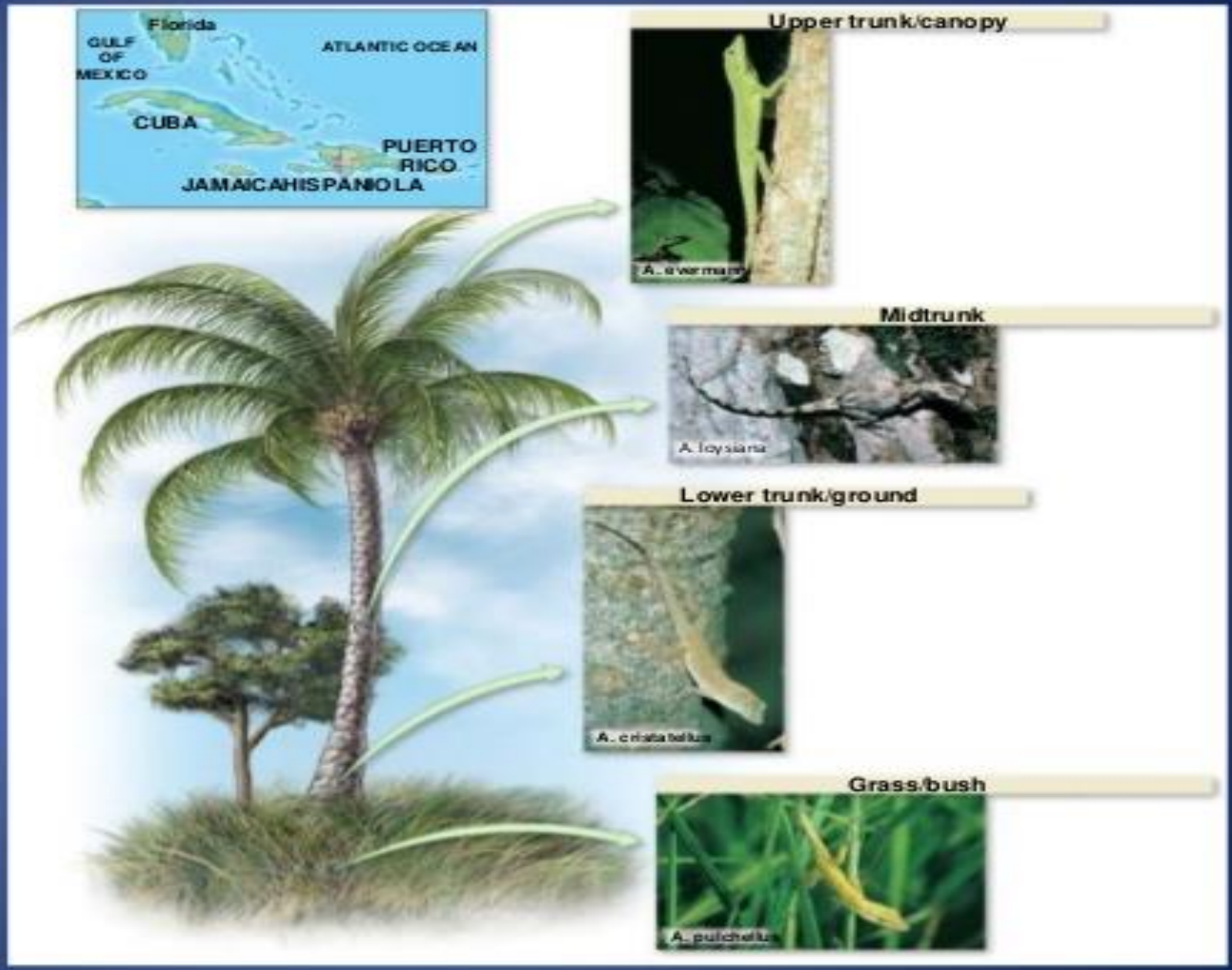
How Does Speciation Occur?

- **Punctuated Equilibrium**—relatively brief bursts of rapid evolution interrupting long periods of little change
  - Fits with allopatric speciation
  - Can occur during adaptive radiation—population inhabiting a patchy environment gives rise to multiple specialized forms in short time period
    - Common in island groups

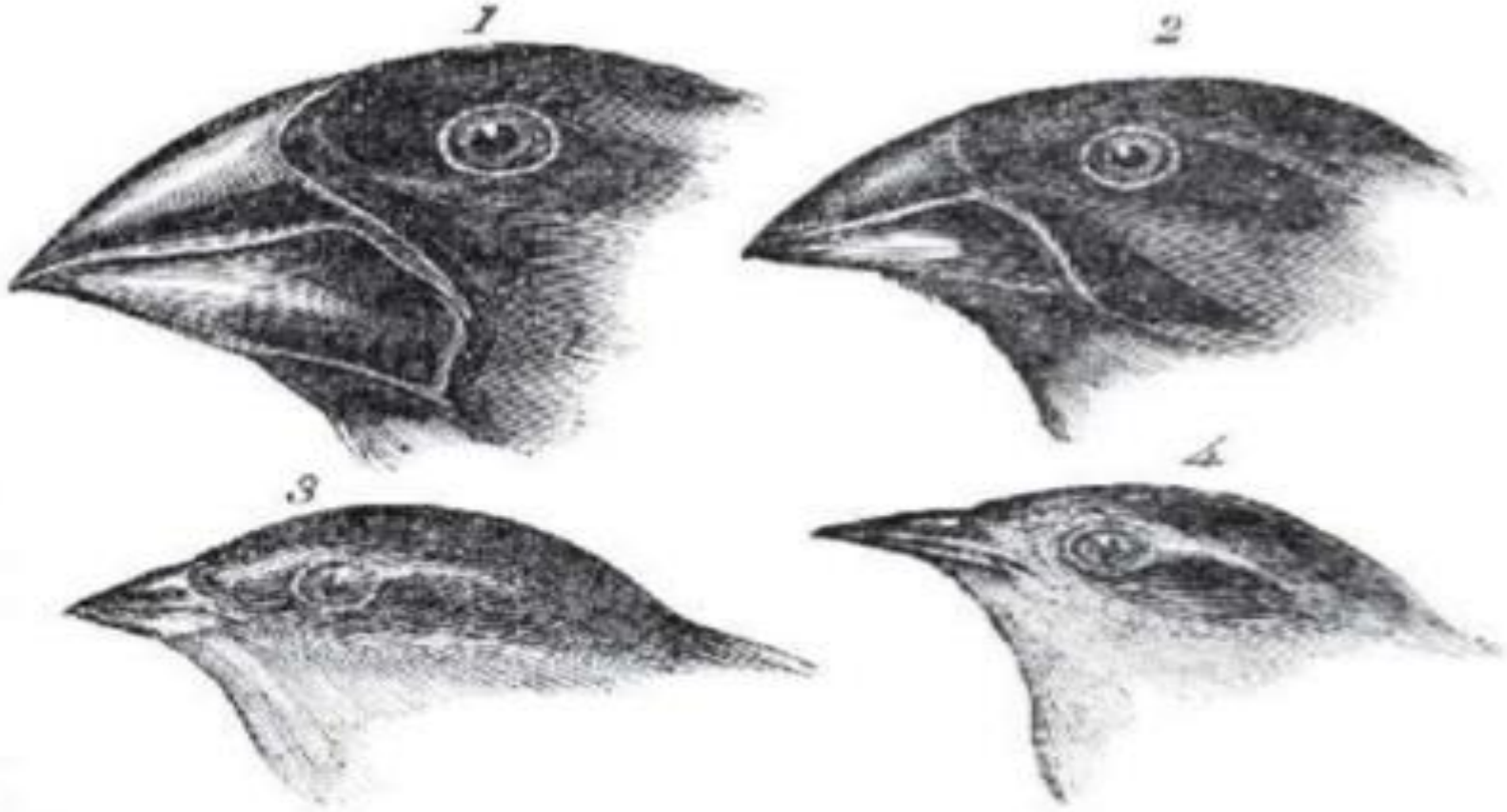
Punctuated Equilibrium



Adaptive Radiation



Adaptive Radiation



1. Geospiza magnirostris
2. Geospiza fortis
3. Geospiza parvula
4. Certhidea olivacea

Finches from Galápagos Archipelago

THANK YOU