

## Ch 22 - Descent with Modification

Ch 22

- The Darwinian revolution
- Descent with modification by natural selection
- Evolution is supported by evidence



A marine iguana in the Galapagos Islands

## Evolution and Biology

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“Nothing in biology makes sense except in the light of evolution.”

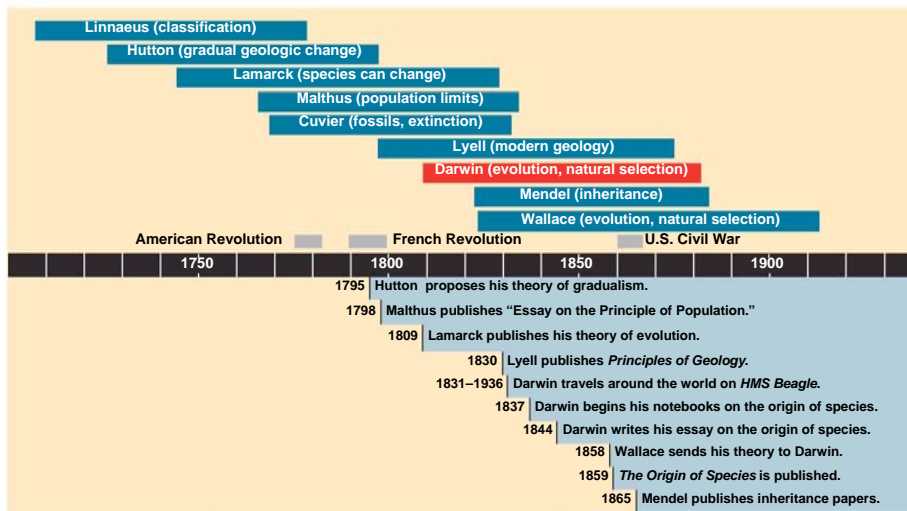
-Theodosius Dobzhansky; Amer. geneticist (1900-1975)



Charles Darwin

## The Historical Context of Darwin's Work

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## If organisms change, then how?

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- Lamarck and others suggest that organisms change
- How?



Jean-Baptiste Lamarck

## Acquired Traits Cannot Be Inherited

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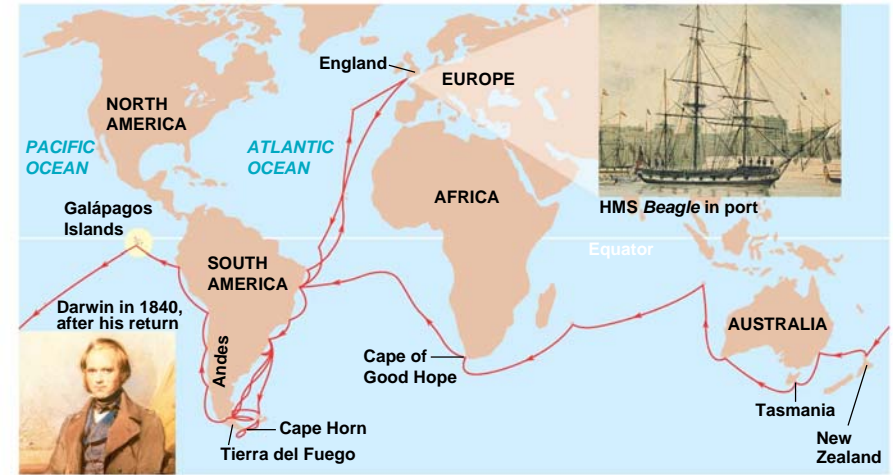


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Bonsai trees are small due to:

## The Voyage of HMS Beagle

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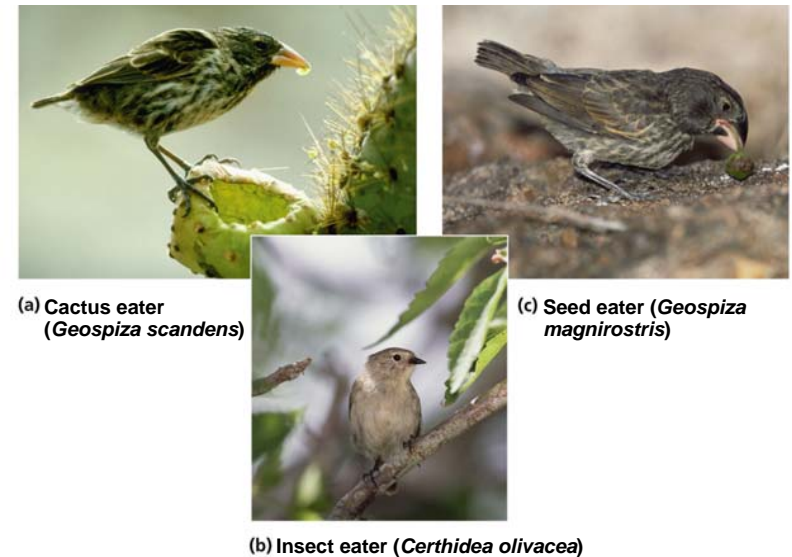
## Darwin Introduces a Revolutionary Theory

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- November 24, 1859
  - *On the Origin of Species by Means of Natural Selection* by Charles Darwin
    - Current species are:
    - Natural selection is:

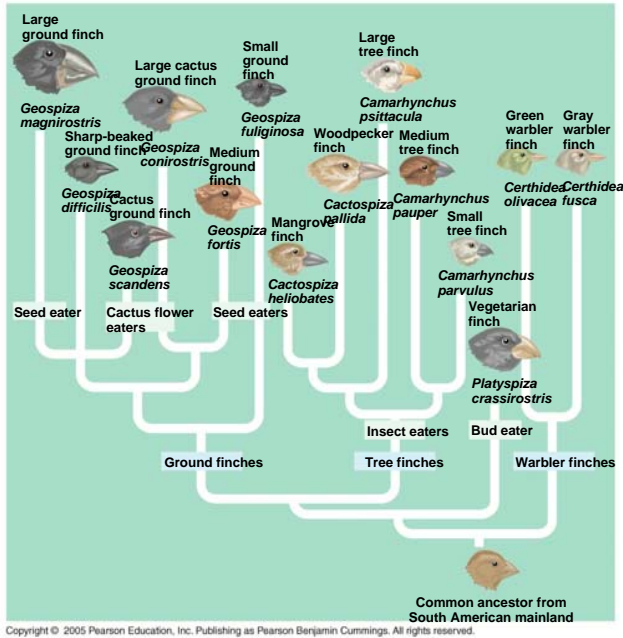
## Adaptive Radiation: Beak Variation in Galapagos Finches

22



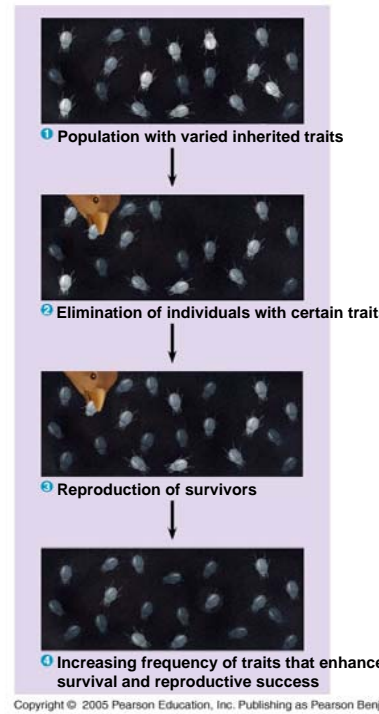
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# Descent with modification -> Adaptive Radiation



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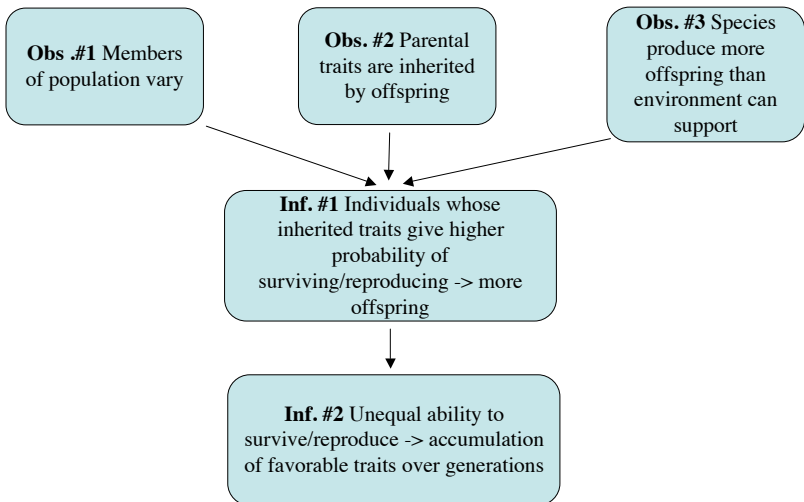
# Natural Selection



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- Natural selection -
- Natural selection →

# Natural Observations and Inferences



# Individual Variation



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Fig. 13.16

## Overproduction of Offspring

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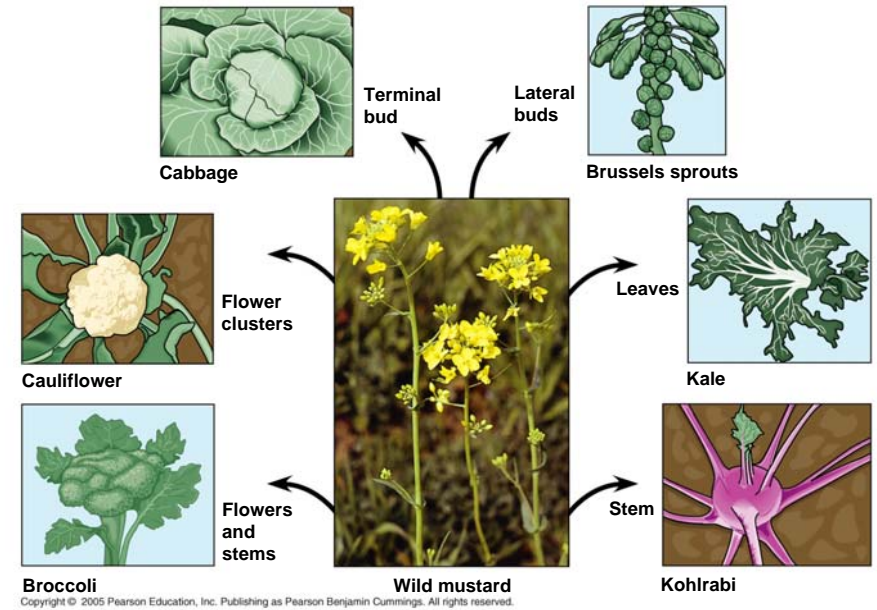


- – Cloud of 1 million spores
- 

Fig. 13.15

## Artificial Selection

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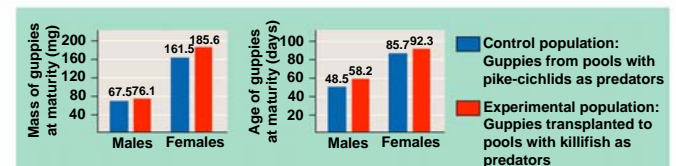
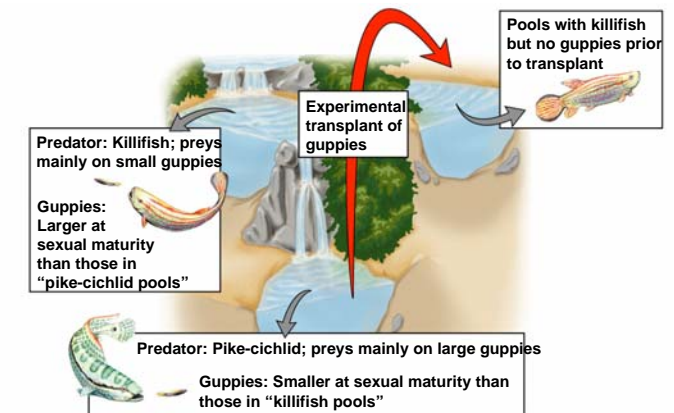
## Evidence of Evolution

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- Scientific studies
- Direct observations
- Fossil record
- Anatomical homology
- Molecular homology
- Comparative embryology
- Convergent evolution

## Predation and Natural Selection in Guppies

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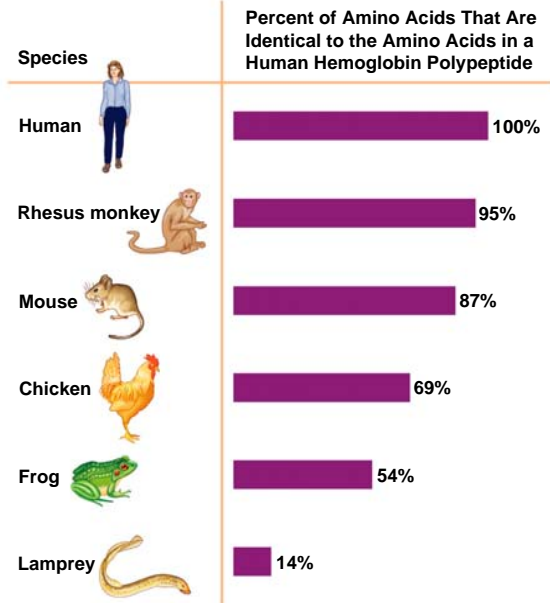




## Molecular Homology

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- Genes shared among organisms:

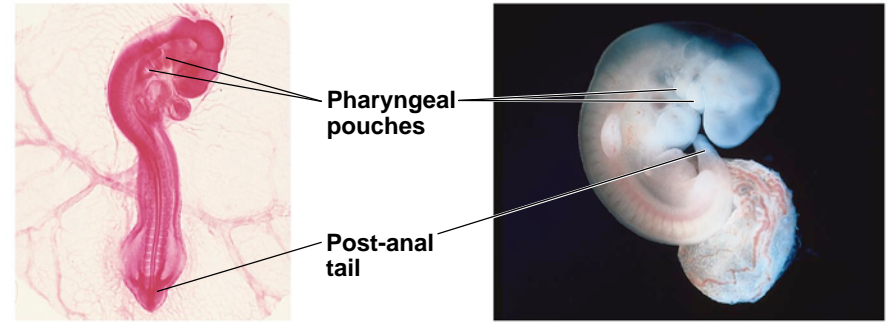


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## Comparative Embryology

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- Comparison of:



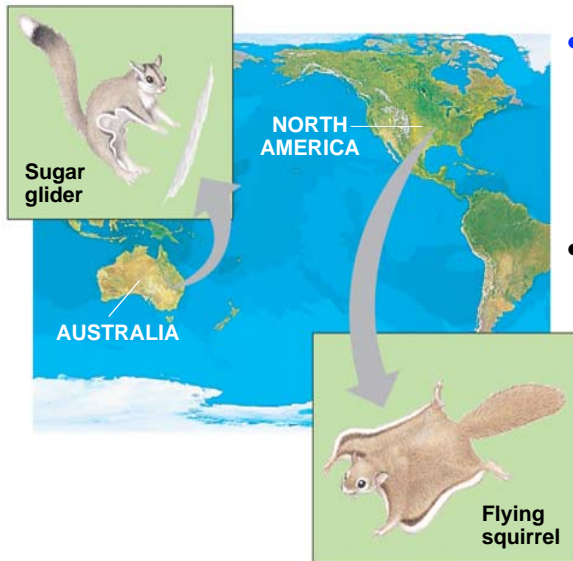
Chick embryo (LM)

Human embryo

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## Convergent Evolution

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- Why?
- Gliding eutherians
  - Sugar glider
  - Flying squirrel

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## What Is Theoretical about the Darwinian View of Life?

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- Theory -
  - Supported by:
  - No observations/data:
- Darwin's theory of evolution by natural selection:
  - 
  -