Charles Darwin and Natural Selection

In 1840, age 31

- Born 12 Feb 1809
- Naturalist on the 2nd Voyage of the HMS Beagle – 1831-1836
- Wrote *The Voyage of the Beagle, The Origin of Species, ..*

Voyage of the HMS Beagle
1831-1836
Darwin in the Neotropical Forests
Rio de Janeiro – April 1832

“It was impossible to wish for anything more delightful than thus to spend some weeks in so magnificent a country.

“In England any person fond of natural history enjoys in his walks a great advantage, by always having something to attract his attention;

“but in these fertile climates, teeming with life, the attractions are so numerous, that he is scarcely able to walk at all.”

Voyage of the HMS Beagle

2nd H.M.S. Beagle Survey (1831-1836)
“Darwin’s Mockingbirds”

Total of 5 species

Darwin’s Finches

Total of 13-14 species
Darwin’s Finches
Character displacement within species – space for time

Evolutionary Change

• Evolution is the observation of change in heritable traits with time

• Changes can occur through selective (deterministic) or random (stochastic) processes.
  • Selection – natural selection, artificial selection
  • Stochastic – genetic drift, founder effect,
Natural Selection

• Competition results in some traits being passed to successive generations at a higher frequency
  - Differential survival only important if it results in differential reproduction
• Differential survival is of individuals
  - Natural selection acts on individuals but results in change frequency of traits in populations.
Peter & Rosemary Grant’s Finches
Character displacement within species – in time

http://www.pbs.org/wgbh/evolution/library/01/6/1_016_01.html

The Grants’ Finches
Character displacement within species – in time

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The Grants’ Finches
Character displacement within species – in time

http://www.pbs.org/wgbh/evolution/library/01/6/l_016_01.html

1976

1978

• Relationship between beak depth of offspring and their parents in the medium ground finch (Geospiza fortis) population on Daphne Major

• The line reflects trait inheritance

• Not necessarily monotonic

http://www.pbs.org/wgbh/evolution/library/01/6/l_016_01.html
Evolutionary Change

- **Evolution** is the observation of change in heritable traits with time
- **Natural selection** is a deterministic process through which heritable traits change with time.

**Observed in –**
Character displacement within species

– *space for time*

– *in time*

1976

1978