Bio 213. Spring 2004

Lecture 3. Development of Evolutionary Theory

I. Understanding biodiversity or why taking this course is worth it

II. Early explanations about diversity

   a. The scale of Nature: Plato, Aristotle

   b. Natural Theology: Linnaeus

III. Hutton's gradualism clearing the way for evolutionary thought

IV. Fossils: how to explain them?

   a. Lamarck

   b. Cuvier

V. The framing of Darwin's ideas on evolution

   a. The voyage of the Beagle

      1. Similarities between temperate and tropical biota in South America

2. Geographic distributions of Galapagos Islands' species

b. Lyell's theory of Uniformitarianism

VI. Two main points in "Origin of Species"

a. Modern biological species descend from ancestral species. Evolution as explanation for life's unity and diversity. Evidence:

1. Resemblance of species living in same geographic area

2. Homologies: structural and developmental; *recent: genetic*

3. Fossil record

b. Mechanism for evolution: natural selection. → *Major breakthrough*

VII. Natural selection

a. Four postulates:
1. Individuals within a population are variable

2. Trait variation is heritable

3. In each generation, more offspring are produced than can survive. Only a subset of them survive and reproduce

4. Subset of survived offspring not random. Individuals with certain traits are more likely to survive and reproduce or produce the greatest number of offspring.

b. How did Darwin make these connections?

1. Natural history

2. Essay by Thomas Malthus

3. Artificial selection

c. Incorporated gradualism to postulate that natural selection could account for the entire diversity of life

VIII. Another example of natural selection: The evolution of insecticide-resistance insects.