
An Importance Of Darwin's Theory Of Natural Selection

Before Charles Darwin wrote his theories he studied a book called "Essay on the Principle of Population" written by Thomas Malthus. (Bioweb. n.d.) This book basically said that the human population is growing faster than the rate that resources such as food can increase to keep up. Therefore human beings are in a struggle and competition for the limited resources. Charles Darwin used and combined this idea with the observation that a variation exists among individuals of a species, and that individuals that have more beneficial variations are more likely to survive and procreate than those of with less beneficial variations. Darwin named this concept "Natural Section."

Natural section must take place within an ecosystem. An ecosystem consists of all the living organisms in a specific area as well as the nonliving things in which organisms will interact with. When the process of natural sections takes place with in its ecosystem, it becomes the mechanism of evolution. Another mechanism of evolution is breeding. When people bread animals for a variety of reasons, it takes the place of natural section and produces the same effect by producing favorable heritable traits. After observing the changes that artificial and natural selection are capable of producing after a few decades of generational change, Darwin theorized that if such changes can come about in just a few generations of reproducing, then a considerable amount of adaption of a species could take place over thousands and thousands of generations.

It is believed that fossils, biogeography, comparative anatomy, comparative embryology, and molecular biology all have evidence in support evolution.

Darwin's theory of natural selection was a major advance over prior ideas as to how organisms changed over time because Darwin proposed a scientific explanation for his observations. Before Darwin's theory of natural selection, natural scientists had the idea that evolution was the "refinement of traits that equip organisms to perform successfully in their environments" (Simon, 2013 p. 245) This would suggest that if body builder spent his life lifting weights and building muscle, then his children would be born with stronger muscles. "However, simple observations provide evidence against the inheritance of acquired traits." (Simon, 2013 p. 245) In contrast Darwin had two main observations to support his theory. The first observation was that a population of a species is able to produce offspring at a faster rate than the environment will produce resources needed to support the new offspring. The second observation was that when you look at different members of the same species, no two are exactly alike, therefore they have different traits. This lead to the concept of "unequal reproductive success" (Simon, 2013 p. 11) which is the idea that those who have the heritable traits best suited for the ecosystem in which they reside will have the greatest changes of reproductive success.

"A mutation is a change in genetic information within an individual" (South University Online, 2013, para. 2). Gene flow is the exchange of genetic information between/among populations. (South University Online, 2013, para. 4). It is believed that a mutation followed by gene flow can cause new traits to form that can assist the natural selection process, and trigger evolution.

Charles Darwin went on a five year mapping and collecting expedition from England to the

South Pacific that including areas of South America and the Galapagos islands on a ship called the Beagle. Darwin's job was the ship naturalist in which he collected specimens, made observations, and kept records. During the trip the captain often dropped Darwin off at one port and picked him up months later at another port. During his time on land, Darwin made his way through miles and miles of unmapped territory. He saw many species and collected many fossils. While sailing on the Beagle he used his time to write notes and cataloged his collections.

At the time when the Beagle voyage came to an end and Darwin and the ship returned to England, Darwin began to analyze his gatherings and discussed them with colleagues. Darwin sent some of his specimens to others to study. A bird expert examined Darwin's bird collections from the Galapagos Islands. He reported that "Darwin had collected 13 similar but separate species of finches. Each finch species had a distinctive bill specialized for a particular food source." (Bioweb, n.d. para. 6) The offspring of these separate finches will most likely look more different as the generations continue to reproduce. Later, Darwin gathered evidence for evolution by natural selection for approximately 20 years. Now days Darwin's finches are considered a classic specimen of adaptive radiation, in which one species spreads into several to exploit a wide range of habitats. "Adaptive radiation is one example of divergent evolution. Divergent evolution is the process of two or more related species becoming more and more dissimilar." (Bioweb, n.d. para. 2)

Comparable to the thirteen similar finches Darwin had collected; homologous arrangements in different species might differ in form and function but show central resemblances since they are believed to have evolved from the same structure in a common descendant. Among the vertebrates, the whale forelimb is modified for navigation in the sea, but the bat wing is adapted for flight. However, there are many elementary resemblances in the bones supporting these two structures.

There are drawbacks in the inspection for homology: Not all resemblance is inherited from a shared ancestor. Convergent evolution is when species from different evolutionary branches may have certain structures that are superficially alike if natural selection has shaped similar variations, this called analogy, not homology. For instance, the wings of insects and those of birds are similar, but they evolved independently and are made from completely different structures. (Simon, 2013, p. 286-287)

Darwin's Finches continue to be a popular subject for evolutionary biologists. Princeton University is conducting a decades-long study of the effects of natural selection on the birds. They have discovered that the finches quickly adapt to irregular deluges and droughts caused by El Niños and La Niñas. Rainfall, or lack of it, controls whether large or small seeded plants will become plentiful, and birds with the correct sized beaks quickly multiply as a result to which seed size prevails. (Hudson River Audubon Society, 2013, para. 2)

Darwin's Theory of Evolution is the commonly held belief that all life is linked and has descended from a common ancestor. Darwin's general theory adopts the development of life from non-life, and stresses a purely naturalistic and undirected "descent with modification". That is, complex beings evolve from more basic ancestors naturally over time. As accidental genetic mutations happen within a creature's genetic code, the helpful transformations are preserved because they assistance survival. These favorable mutations are handed down to the next generation. Over long periods of time and many generations over, beneficial mutations

accumulate and the outcome is an entirely different organism, not just a variation of the original, but an entirely different creature. (All about Science, 2013, para 1)

Darwin's Theory of Evolution is a slow ongoing process. Darwin wrote, "...Natural selection acts only by taking advantage of slight successive variations; she can never take a great and sudden leap, but must advance by short and sure, though slow steps."

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