Re: A question of timing

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Mr. Nuwer:

I will try to answer your question "So I am wondering what it is about Darwinian evolution that_requires_a long and gradual process." If you are looking for a more scientitic answers maybe one of the few biologists on s.b.e. will answer. An alternative is to take courses in biology.

The reason Darwinian evolution in general is gradual is due to phyletic gradualism and a example is given of the eye which is a complex adaptation. There also may be room for what is called punctuated equilibriumism but this only occurs in small isolated populations in peripatric speciation. Punctuated equilibrium is only fast in geological time. The author states, "
"What is rapid? 10,000 − 100,000 years can be an instant in geological time (especially in the context of some deposition rates) but is ample time for evolutionary events in populations. Recall that the shift from the peppered to the dark form of Biston betularia occured within the span of 100 years by a completely "Darwinian" mechanism.

Also, one has to consider the species and its environment. There are those who will argue there have been many adaptations of sharks over the millions of years (and there have been) but their "basic plan" doesn't seem to have changed much. If that is not a good example one can take the Duckbill Platypus which has not changed signifigantly in millions of years. The point is there are organisms which have been around far longer than humans (such as bacteria) and several of them haven't evolutionarily changed much in millions of years and long before Homo Sapiens which certainly evolved over time more. There are creatures which have been around longer than Homo Sapiens and haven't evolved hardly compared to newcomer Homo Sapiens on the evolutionary scene. So its a combination of the particular organism and its environment which effects Darwinian evolutionary changes or speciation. In fact, despite all the speciation changes we've made over millions of years I think Homo Sapiens are no longer adaptable to their environment. So although I know Darwinian evolution is scientifically proven I think it will be necessary for man to intervene in Darwinian

evolution and through possible advances in germline genetic engineering tailor our genome to where it is adaptable to its environment. Unfortunately, it won't possibly come soon enough to prevent living nightmares to many children and women. The four horsemen are still in the DNA charriot.

Another example of graduality in Darwinian evolution is "stasis". Stasis means good Darwinian evolution it it selects the stronger over the weaker. Or, the weak, diseased and stupid are selected against while those who are healthy, strong and intelligent survive and reproduce. This has been somewhat weakened due to modern "civilization" but the underlying mechanism operates. By those standards one might think Darwinian evolution is good and some would like to take away civilization's constraints and alllow it totally unimpeded. Remember, however, what I stated about Darwinian evolution. In a nutshell, I think it is incompatible with modern civilization. This is not a new concept by any means. Freud, Hawking and others. So I think the following statement I found is true, " If stasis is due to developmental constraints then there is an interesting "battle" going on between the environment and the homeostasis of the organism. When I read that it hit me in the gut.

Michael Ragland

The punctuation debated focused a lot of interest on the notion of hierarchical phenomena (sensu units of selection). One important hierarchical issue is Species Selection: differential rates of increase or decrease in species diversity among different lineages due to differences in rates of speciation and/or extinction. The basic principles of species selection are 1) speciation is random with respect to phenotype, 2) most changes occur at speciation, 3) different extinction and speciation rates are due to some biological properties of the different taxa.

Some consequences: 1) species selection can introduce evolutionary trends and 2) differences in morphological or taxonomic rates of evolution among different lineages can be due to species selection. The important point is that it is the pattern of speciation that drives such trends, not the direction of morphological changes.

An excellent example of the dynamics of species selection (or how one might interpret data from the fossil record in light of differences in extinction and speciation rates) is provided by Hansen's studies of planktotrophic vs. non−planktotrophic gastropod (snails). Planktotrophic lineages last longer in the fossil record (lower extinction rate) See fig. 23.3, page 643. However, the proportion of planktotrophs decreases in the fossil record (see figure 23.4, page 645 and note typo in figure caption). How can one account for this apparent paradox? If one invokes a higher speciation rate among non−planktotrophs, then this might do it; i.e., species selection might account for the patterns of diversity changes. Read the text for this section (pp. 641−644).

A general question about species selection: is it a pattern or a process? Following the parsimony of G. C. Williams, can we explain species selection by differential survival of individuals within populations, and if so is species selection just a by−product of individual selection., or do higher level processes operate? (thus the hierarchical issue in species selection). If the latter is true, the big question remains: is macroevolution decoupled from microevolution?? (i.e., are population−level processes insufficient to account for evolution above the species level? If you talk to a population geneticist they would say NO! If you talk to a paleontologist some would say OBVIOUSLY!

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