Microevolution and macroevolution in teaching and learning

Science, Anthropology

Microevolution and Macroevolution Microevolution is a process of evolution that leads to minor changes to a population’s gene pool, specifically because of variation that is generated by mutation and genetic recombination. Within the population, these genetic changes are manifested in different genotypes, while they appear in the individuals as different phenotypes (Rosengren 23). Whereas the evolutionary force of genetic drift influences the genotype, natural selection can only influence the phenotype. With time, genetic drift and natural selection lead to macroevolution, which, in turn, leads to significant changes to the gene pool and the evolution of other new species. Macroevolution can either be in the form of punctuated equilibrium where it happens very quickly following a stable period, or in the form of gradualism where changes are gradual over a long time period (Rosengren 24). Generally, macroevolution is the total of microevolution over extended time periods and occurs above the level of the species. On the other hand, microevolution denotes changes in allele frequencies that lead to smaller evolutionary changes in the population (Rosengren 30). Microevolution, therefore, can be considered as the normal evolutionary mode. These two processes of evolution are linked by speciation or isolated populations, which can be considered to fall in either process’ scope. In microevolution, new species are not formed, and if the changes are not maladaptive, it is possible for these changes to persist in the species, as well as the population. If a new opportunity is presented, a select group of individuals could adapt to a different environment or source of food. Where the adaptations leads to the parental species and the adapted individuals having offspring that is maladaptive, reproduction isolation is the result (Rosengren 31).

Macroevolution and microevolution basically address the same process, which is gene frequency changes, meaning that both use the same mechanisms. Small-scale allele frequency changes within the population that occurs in microevolution could be as the outcome of natural selection, gene flow, genetic drift, or genetic drift (Rosengren 33). Natural selection entails a progression in which individuals that adapt best produce the most number of offspring, which also transfer their parents' genes to their offspring, giving them a survival edge. Genetic drift, on the other hand, would involve a random process where chance has a key role in determining the alleles or gene variants that survive. In gene flow, specific genes of one population are carried to another, transporting to these populations new genetic material. Finally, mutations, like genetic drift, are random but result in alterations to the DNA of the individual, which could change many aspects of their life, including basic physiology (Rosengren 34).

The process of microevolution is best studied through the biology branch of population genetics or ecological genetics, which are dedicated to the observation of microevolution as it occurs in nature. Some observable evolution examples that can be described as microevolution include the existence of several strains of bacteria resistant to antibiotics (Rosengren 34). The process of macroevolution contrasts with microevolution as it is the occurrence of gene frequency changes on a large scale over an extended period of time. Therefore, the major difference between the two processes has to do with focus. Whereas macroevolution is holistic, microevolution is reductionist, and the two processes reveal distinct evolutionary aspects (Rosengren 34). Because macroevolution is referent to evolutionary changes

that occur above species' level, it can be concluded that it is ultimate driving force is adaptation.

Work Cited

Rosengren, Karl S. Evolution Challenges: Integrating Research and Practice in Teaching and Learning about Evolution. Oxford: Oxford University Press, 2012. Print.