Population Ecology

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Preface

Population ecology is a subfield of ecology that deals with ecology differences within and between populations, and is a part of evolutionary biology such as growth population, adaptation, speciation, population structure and it's also a vital ingredient in the emergence of the modern evolutionary synthesis. Its primary founders were Sewall Wright, J.B. S. Haldane and Ronald Fisher, who also laid the foundations for the related discipline of quantitative ecology. Traditionally a highly mathematical discipline, modern population ecology encompasses theoretical, lab, and field work. Population ecology models are used both for statistical inference from ecological data and for proof/disproof of concept. What sets population ecology apart today from newer, more adaptational approaches to modelling evolution, such as evolutionary game theory and adaptive dynamics, is its emphasis on different ecological phenomena as dominance, epistasis, and the degree to which ecology and parental investment and offspring of reproductive strategies. This makes it appropriate for comparison to population data.

Evolution is change in the heritable characteristics of biological populations over successive generations. These characteristics are the expressions of animal-animal interaction, animal social behavior that are passed on from parent to offspring during reproduction. Different characteristics tend to exist within any given population as a result of ecosystem services, protected areas and other sources of population variation. Evolution occurs when evolutionary processes such as natural selection (including sexual selection) and certain characteristics becoming more common or rare within a population. It is this process of evolution that has given rise to biodiversity at every level of biological organization, including the levels of species, individual organisms.

The scientific theory of evolution by natural selection was proposed by Charles Darwin and Alfred Russel Wallace in the mid-19th century and was set out in detail in Darwin's book On the Origin of Species (1859). Evolution by natural selection was first demonstrated by the observation that more offspring are often produced than can possibly survive. Thus, in successive generations members of a population are more likely to be replaced by the progenies of parents with favorable characteristics that have enabled them to survive and reproduce in their respective environments.

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All life on Earth shares a last universal common ancestor (LUCA) that lived approximately 3.5–3.8 billion years ago. The fossil record includes a progression from early biogenic graphite, to microbial mat fossils, to fossilized multicellular organisms. Existing patterns of biodiversity have been shaped by repeated formations of new species (speciation), changes within species (anagenesis) and loss of species (extinction) throughout the evolutionary history of life on Earth.

Morphological and biochemical traits are more similar among species that share a more recent common ancestor, and can be used to reconstruct phylogenetic trees. Evolutionary biologists have continued to study various aspects of evolution by forming and testing hypotheses as well as constructing theories based on evidence from the field or laboratory and on data generated by the methods of mathematical and theoretical biology. Their discoveries have influenced not just the development of biology but numerous other scientific and industrial fields, including agriculture, medicine and computer science. medicine and computer science.

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