New Concepts in Biological Classes of Organisms

Evolutionary relations are better represented by new classifications than by the traditional concepts.

S. H. Mathewson and Whittaker RH.

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Introduction

Biologists are often asked what the definition of a species is. Before dealing with this question it is important to consider the differences between what a species is and how species come into being. The ‘what’ question deals with the main subject of this essay, how do you define a species. The ‘how’ question deals with processes and mechanisms.

I would like to write about this part first; partly because it is the really contentious and interesting part of the question and partly to clear up any misunderstanding between definitions (what) and mechanisms (how).

Species, at their most abstract, can be thought of individual historical entities. This is to say, like the most basic story outline, they have a beginning, middle and an end. Or, if you prefer, a birth, lifespan and a death. Just as all people do. So species, like people, exist at certain places and certain times.

Birth of species

How the birth of species comes about is a question of mechanism(s) that I will not go into in very much detail, but the key image to have is the notion of a single homogeneous population (group of individuals) that eventually gives rise to two distinct populations that can no longer combine their genetic material to give rise to more of their kind. The most widely accepted method by which this can come about is the subdivision of the single population into two subpopulations by the appearance of a geographic barrier (a mountain range, a new river) that can no longer exchange genes. As time passes then the genetic make-up of the two subpopulations could evolve enough to generate sufficient differences that would mean they are no longer two subpopulations, but are in fact different species. It should be clear that at least some time has to pass for enough differences to accumulate for the two subpopulations to become separate species, but the amount of time varies, due to a wide range of factors.

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Biology is the science of life.

Properties of Life.

In its broadest sense, biology is the study of living things—the science of life. Living things come in an astounding variety of shapes and forms, and biologists study life in many different ways. They live with gorillas, collect fossils, and listen to whales. They isolate viruses, grow mushrooms, and examine the structure of fruit flies. They read the messages encoded in the long molecules of heredity and count how many times a hummingbird's wings beat each second.

What makes something "alive"? Anyone could deduce that a galloping horse is alive and a car is not, but why? We cannot say, "If it moves, it's alive," because a car can move, and gelatin can wiggle in a bowl. They certainly are not alive. What characteristics do define life? All living organisms

1. Order.

   All organisms consist of one or more cells with highly ordered structures: atoms make up molecules, which construct cellular organelles, which are contained within cells. This hierarchical organization continues at higher levels in multicellular organisms and among organisms.

2. Sensitivity.

   All organisms respond to stimuli. Plants grow toward a source of light, and your pupils dilate when you walk into a dark room.

3. Growth, development, and reproduction.

   All organisms are capable of growing and reproducing, and they all possess hereditary molecules that are passed to their offspring, ensuring that the offspring are of the same species. Although crystals also "grow," their growth does not involve hereditary molecules.

4. Regulation.

   All organisms have regulatory mechanisms that coordinate the organism's internal functions. These functions include supplying cells with nutrients, transporting substances through the organism, and many others.

5. Homeostasis.

   All organisms maintain relatively constant internal conditions, different from their environment, a process called homeostasis.