Robert Harding Whittaker Biography

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Biography

Robert H. Whittaker was an American ecologist, who was a professor at Cornell University. He studied terrestrial plant communities in the northeastern United States, particularly in parts of the Appalachian Mountains. He is best known for his contributions to the development of theories of the organization of ecological communities. In particular, Whittaker believed that species respond to variations of environmental factors on an individualistic basis. As such, the assembly of species within communities is somewhat arbitrary, depending on local environmental conditions, in combination with competitive and other ecological relationships occurring among the species present. As such, communities consist of biological and non-biological components, which interact closely, but do not have any inherently central, control system. This is a quite different idea from that of F.E. Clements, an earlier American ecologist, who suggested that communities represented a strongly integrated, organismic unit, which was even capable of evolution.

One of the powerful analytical tools used by Whittaker is known as gradient analysis, in which the distribution of species is plotted against variation of one or more environmental variables. For example, the abundance of a tree species (such as white pine, *Pinus strobus*) might be plotted against elevation in a mountainous region, or against moisture or nutrient content of the soil. Plots of this sort are known as response curves, and they reveal that species have idiosyncratic distributions, and that community composition varies continuously along gradients of environmental change, as occurs, for example, with changes in altitude up a mountain. Observations such as these were central to the rationalization of Whittaker's ideas of community organization.

In 1969, Whittaker proposed that the diversity of life should be divided among five kingdoms: Monera, Protista, Plants, Animals, and Fungi. This system of classification has become widely adopted by biologists around the world.

Robert Whittaker and his many students and other colleagues published numerous important papers and books in biology and ecology. Among his more prominent contributions were: *A Consideration of Climax Theory: the Climax as a Population and Pattern* (1953), *Vegetation of the Great Smoky Mountains*(1956), *Classification of Natural Communities* (1962), *Gradient Analysis of Vegetation* (1967), *Communities and Ecosystems* (1970), *Evolution in Natural Communities*(1972; with G.M. Woodwell), *Classification of Natural Communities* (1978), and *Ordination of Plant Communities* (1982).