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Commentary

# Phylogenetic Distance, Genetic Variety and Abundance in Biodiversity

**J. Reid***

*Department of Biology, Carleton University, Ottawa, Canada*

**Corresponding Author**
J. Reid
quachfelix@griffith.edu.au

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## 1. Commentary

The term "biodiversity," which is a contraction of "biological diversity," is relatively new and has clear historical roots. The term "biodiversity" was coined in the 1980's, just around the time that genetic engineering and conservation biology emerged as two brand new scientific disciplines. Genetic material is now being traded as a natural resource and used as the foundation for a new business as a result of technological advancements in genetic engineering. With its emphasis on the connections between genetic varieties, genetic exchange, species population numbers and species extinction rates, conservation biology evolved from an effort to structure conservation policies on the scientific foundation of evolutionary biology. In 1986, the latter field gave rise to the word biodiversity. When planning the national forum on biodiversity, Walter Rosen, a senior programme officer for the board of basic biology at the national science research council at the time, is credited with coining the phrase. It is a broad term that describes the variety found throughout the entire biosphere of the planet as assessed at many scales, including those between individuals, populations, species, communities and ecosystems. Thus, genetic, species and habitat diversity are all included in biodiversity.

Different definitions of biodiversity include genes, species (or higher taxa) or ecosystems. Numerous writers have merged the genetic and organismal elements and in numerous palaeontological investigations, a distinct distinction between taxonomic variety and disparity the level of morphological variability exhibited by a collection of taxa is now frequently stated. Phylogenetic distance and a variety of phonetic indices can both be used to measure disparity. Prior to the high in species richness being reached, disparity may reach its peak within the history of a large clade.

Aside from disparity, two fundamental types of biodiversity assessment have gained popularity: Differentiation diversity, which measures the variation (or similarity) between levels of differentiation diversity and inventory diversity, which records the number of species per unit area. The most prevalent type of inventory diversity is alpha diversity or within habitat diversity, which counts the number of taxa in an area of homogenous environment to reflect the density of species within a community. Alpha diversity or the number of species in a region, is what it is at its most basic but, especially in the study of modern diversity, its measurement also include some estimation of abundance. The variance in taxonomic composition between regions with alpha diversity is measured by the differentiation statistic known as beta diversity. The term epsilon diversity has been used to describe the inventory diversity of a large biogeographical region and the term delta diversity is occasionally used to describe the variation. For larger areas, the term

gamma diversity has been used to reflect the number of taxa on an island or in a distinctive landscape. Gamma diversity, on the other hand, refers to differentiation diversity that measures taxonomic differentiation between geographical locations and thus reflects provinciality or the degree of endemicity. This word has been widely employed in palaeontological investigations of marine faunas.

One crucial aspect of biodiversity study has been the estimation of the number of higher taxa; while one point sample or community may have more species than another, it may also have fewer higher taxa, which could mean poorer genetic diversity and morphological disparity. Furthermore, higher taxa are frequently used in biodiversity analyses as substitutes for species, particularly but not exclusively in the fossil record, where this strategy lessens the effects of preservational biases, ambiguities in species identification and the worst excesses of overly divisive species level taxonomy. Additionally, it makes it easier to analyze the richness of biotas where species level identifications haven't been done yet for lack of time or knowledge. However, there is a need for care because, at best, the association between the number of species and the number of higher taxa is crude and gets worse as taxonomic rank rises. As a result, the diversity curves derived from ever higher taxa and those derived from species are more at odds with one another.

Viruses, bacteria, actinomycetes, fungi, algae, protozoans (single celled eukaryotes), microscopic invertebrates like rotifers, tardigrades (water bears), soil planaria, (flatworms) and nem-atodes (roundworms), as well as larger invertebrates that are visible to the naked eye like terrestrial gastropods (snails and slugs) because of this diversity, invertebrates are typically divided into microfauna, mesofauna and macrofauna groups based on size (body width). Vertebrates, such as moles, prairie dogs, meercats, wombats, small rodents and some species of lizards, snakes, frogs and even birds, rely on the soil as a habitat as well.