1077-92-2516 **Mark E Ritchie*** (meritchi@syr.edu), Department of Biology, 107 College Place, Syracuse University, Syracuse, NY 13244. *Fractal geometry: a pathway to understanding biodiversity.*

Biologists have devoted much of the past 50 years to understanding how many species can coexist in the same environment when limited by the same resource. Previous theoretical treatments using differential equations to describe dynamical systems of consumers and their resources produced unacceptable predictions of either victory by a single species or coexistence by an infinite number of species. Here, I present the idea that nature, to a first approximation, exhibits fractal geometry, and that the encounter of fractal resources by organisms depends is scale-dependent. Thus a fractal description of nature predicts that species of different body size should consume non-overlapping sets of clusters of "food" containing different concentrations of a common limiting resource. Fractal geometry thus predicts that a finite number of species of different body size can coexist in a particular environment and corollary predictions follow about the size, abundance, membership, and number of species that should coexist. These predictions are strongly supported in many real communities, which suggests that Describing nature with fractal geometry provides long-sought insight to understanding how environmental conditions drive biodiversity. (Received September 22, 2011)