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Fractal-like aspects of the microbial part of the pelagic food web?.

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From many perspectives, most of the biological activity in pelagic systems is in the microbial part, invisible to the naked eye. Conceptual perceptions of this system vary from the overly simplistic in nutrient-phytoplankton-zooplankton models, to one of "unmanageably complexity" in the large sets of data recently collected by metagenomic techniques. The interacting members of this microbial community range in size from viruses to large diatoms and ciliates and cover a linear size range around 3 orders of magnitude (9 orders of magnitude in volume). One pattern-generating mechanism in this system is what has been termed "killing-the-winner" where the biomass-controlling effect of a predator or parasite allows the co-existence of organisms classified as competition and defense strategists. Since this mechanism can be seen to repeat itself at many levels of resolution, it is suggested to have a resemblance to the concept of self-similarity in fractal theory. On a higher level, the outcome of these interactions is size-abundance curves that are known to follow power-law relationships and therefore also allows one to draw an analogy to fractal dimensions. This perspective is suggested to allow another entrance to the problem of connecting phenomena at different scales in the pelagic food web, compared to the more traditional attempts to build plankton functional type model of ever-increasing complexity.