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Microbial gardening in the ocean's twilight zone: detritivorous metazoans benefit from fragmenting, rather than ingesting, sinking detritus

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Organic particles that sink into the deep ocean help keep the atmospheric CO<sub>2</sub> concentration significantly lower than it would otherwise be. Organisms inhabiting the ocean's twilight zone (~50-1000m beneath the surface) remineralize sinking organic carbon, thereby influencing the efficiency of oceanic carbon storage. Zooplankton in the twilight zone appear to fragment, rather than ingest, the majority of encountered organic particles, thereby stimulating the proliferation of bacteria and the associated communities of heterotrophic flagellates and ciliates. We develop the idea that this apparently counterintuitive behaviour is an example of 'microbial gardening', a strategy that exploits the catabolic and anabolic capabilities of microorganisms to facilitate the "gardeners'" access to a suite of otherwise unavailable micronutrients that are essential for metazoan life. We explore this concept using a simple steady state model and highlight the benefits and limits of this trophic strategy. The associated publication is freely available to download: BioEssays 36: 1132-1137 (2014). doi:[10.1002/bies.201400100](https://doi.org/10.1002/bies.201400100)

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