Enhancement of marine phytoplankton blooms by appendicularian grazers

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ABSTRACT: Short-lived blooms of large phytoplankton are the main vector in the atmosphere-ocean-sediment carbon flux and are associated with high fish production. A common assumption is that grazing zooplankton can only have a negative effect on the growth of these blooms. We have found that appendicularians, the most abundant microphagous metazoans, strongly stimulate the magnitude of experimentally induced blooms and that this effect can be scaled to any appendicularian density. Moreover, during a postspring bloom cruise in May 2000 off the central Cantabrian coast, we found a high positive correlation between the biomass of large phytoplankton and the abundance of appendicularians. These results suggest that these marine microphagous zooplankton actively catalyze the biological CO_2 pump by shifting the size structure of phytoplankton blooms toward large, rapidly sinking particles.