

The ctenophore *Mnemiopsis leidyi* has since 2006 been present in coastal waters of the Skagerrak during autumns and caused serious declines in zooplankton populations. Anecdotal observations has reported the virtual disappearance of calanoid copepods for several months concurrent with mass occurrences of the jellyfish. Yet, there has been no quantification of the food web implications of the invader. We sampled the full range of mesozooplankton, ctenophores, phytoplankton primary production and chlorophyll over 8 years (2007-2014) and compared the autumn pelagic food web in years with and without the ctenophore. Copepods were significantly reduced during August-November in years when *Mnemiopsis* was present and this lead to a released grazing pressure on phytoplankton. Accordingly, significantly elevated chlorophyll concentrations were observed in years of high ctenophore abundance and this occurred despite declining primary production due to light limitation. The combination of increased phytoplankton biomass and declining production links the top-down effect on copepods with lower trophic levels. The study shows trophic cascades in a coastal plankton community which typically is considered to be bottom-up controlled. Predatory control of the copepod populations therefore emerges as a key factor for the regulation of the phytoplankton populations in autumn.