

Response of small grazers to iron-induced phytoplankton blooms in the Antarctic Polar Frontal Zone

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Mesoscale *in situ* iron fertilisation experiments have resulted in the build-up of phytoplankton biomass and established beyond doubt that iron availability is the key factor limiting growth rates of oceanic phytoplankton in "high-nutrient, low-chlorophyll" (HNLC) regimes (see poster Assmy *et al.*). The response of important groups (microproto-, mesoproto- and small metazooplankton) of the pelagic community and the processes within the food web (Fig. 1) were studied in detail and compared with processes in the surrounding water during two iron fertilisation experiments in austral spring (EisenEx) and summer (EIFEX).

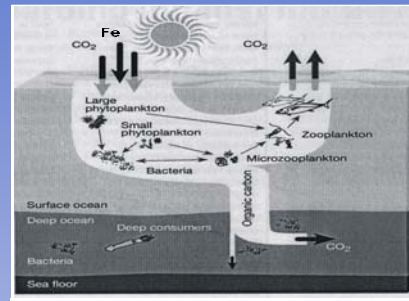


Fig. 1: The complex phytoplankton-based food web (Fig. modified from a graphic by Z. Johnson)

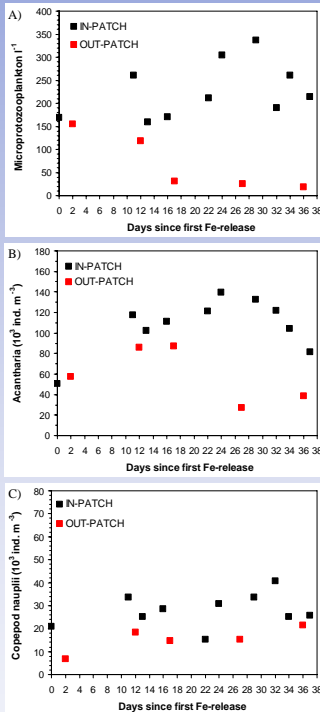


Fig. 2: Temporal development of A) microprotozooplankton, B) acantharia and C) copepod nauplii abundance during EIFEX. Data from 20 m depth.

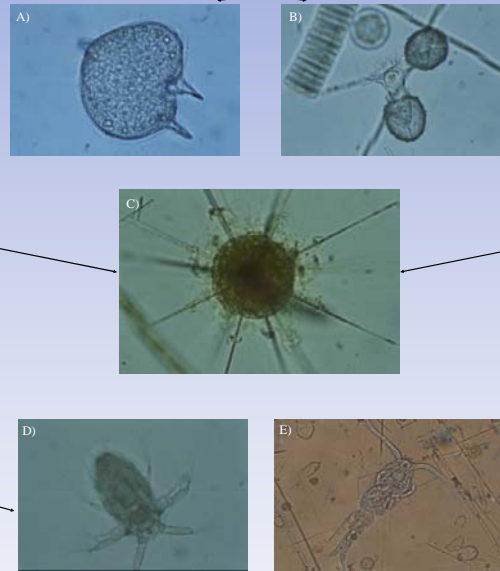


Fig. 3: Light micrographs of some dominant genera or groups of microproto- (A, B), mesoproto- (C) and small metazooplankton (D, E). A) Thecate dinoflagellate (*Protoperidinium* spp.), B) tintinnid ciliate (*Codonellopsis pusilla*), C) acantharia, D) copepod nauplii and E) adult of *Oithona similis*.

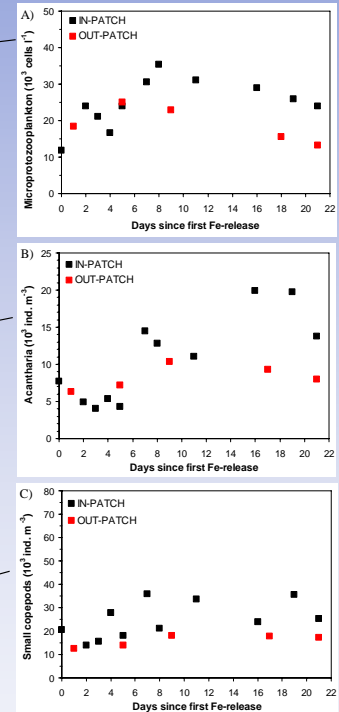


Fig. 4: Temporal development of A) microprotozooplankton B) acantharia and C) small copepods (<1.5 mm) abundance during EisenEx. Integrated over 80 and 150 m depth, respectively.

Conclusions

- Microprotozooplankton show only a small increase in abundance
 - Tight coupling between prey and predators regulates population dynamics
- For the first time it could be shown that Acantharia respond to enhanced primary production with population growth within short time scales
 - Indication for their role as possible paleoproxy for high productivity regimes
- Small pelagic copepods show significant increase in abundance
 - Significant portion of the fertilised phytoplankton biomass was channelled to higher trophic levels